JUL 8 1943

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American Foundryman

A PUBLICATION PRESENTING ASSOCIATION AND CHAPTER ACTIVITIES

The Future of the Industry, See Page 2. Classifying Scrap for Gray Iron Melting, See Page 9. Why Foremen Should Use Time Study, See Page 11. The "Over" Castings Problem, See Page 16. A Rapid Fineness Testing Method, See Page 17.

July 1943

Vice-President Teetor Calls Upon Foundrymen for Vital Service to Their Industry

DURING these days of war uncertainties, it is not unreasonable for one to look upon any escapable demand upon one's time and energies, as something to be avoided. Usually this outlook is based on the plea of one's own essential work, obligations of community defense activities, and other manifold requirements on the individual's time. So, during this period, it is doubly important that we be certain that we do not fail to devote our energies, wherever we can, to the well-being of our Foundry Industry in general.

During the coming year, busy men of the foundry industry will be called upon to do those things which are essential to its health and continued growth. They will be called upon to undertake duties which will take their time and will yield to themselves no direct return. They will be called upon to devote time to committee work, and to prepare papers and reports, the continuance of which activities has played so important a part in the development of A.F.A. in the service of the Industry.

Of primary importance is the continuing enlargement of our chapter activities. Chapters have grown to strong and virile units through the devotion of much time and effort on the part of their officers and memberships. It is through the chapters that the greatest number of real shop foundrymen can have close contact with A.F.A. between conventions. It is through the chapters that they can get together for discussion of matters of immediate import to the war.

Chapter meetings are directed not only to the interest of old members, but are a continuing influence looking toward the attraction of newer men who are on the way up in the foundry industry. The chapters have had much to do with the growth and strengthening of A.F.A., not only in the matter of memberships which are so vital to the health of the Association, but in developing leadership and insuring the continuing interest in and promotion of the objectives of the Association.

Thus, when called upon, *do what you can.* The value of your efforts to your industry today is all the greater because of the many competing demands upon your time.

Ralph J. Teetor

RALPH J. TEETOR, Vice-President
American Foundrymen's Association

RALPH J. TEETOR, President of Cadillac Malleable Iron Co., Cadillac, Mich., has long been an active member of A.F.A. as the author of convention papers, member of the Advisory and other Malleable Division committees, and as a Director (1933-1935). He was successively connected with the Link Belt Co., Indianapolis; Standard Malleable Iron Co., Muskegon, Mich., and the Howe Chain Co., Muskegon, before establishment of the Cadillac company.

American Foundryman

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Let's Look at the Foundry Industry

By Arthur J. Tuscany,* Cleveland

This article, condensed from paper before a recent meeting of the Northeastern Ohio Chapter, is published as a broad survey of the Foundry Industry, with special emphasis on its opportunities for cooperative advancement. In the race for post-war business, the Foundry Industry is apt to find itself seriously handicapped by lack of publicity unless plans are made now for cooperation in publicizing the foundry product as a whole, rather than depending upon individual promotion of particular kinds of cast metals. There are numerous examples of successful public relations programs by an entire industry, a field as yet relatively untouched by foundry interests.

THE foundries of this country are making a very much larger contribution in the war effort than they themselves appreciate or realize.

Here is an industry estimated to embrace hundreds of thousands of employees, and a billion dollars of invested capital, with annual sales of over three billion dollars devoted almost entirely to the war effort. The relative part this industry is playing in winning the war is even greater than the corresponding responsibility carried by foundries in peace times. Many articles of war manufacture produced by foundries are military information.

This fact suggests that to gain a quick view of the foundry's contribution to waging war, we evaluate briefly the many ways in which castings serve in the daily peace-time activity of our people, recognizing that the importance of our product in war pursuits is even greater than in peace time endeavors.

Castings In Every Field

When the alarm clock announces time to start another day, we can reflect that the clock was made possible by the use of equipment produced by the help of foundries. We arise from a bed which may carry many castings, or at least was manufactured from equipment made in the foundries. As we draw the water for that morning shower, do we properly appreciate the fact that only through the use of many castings is the water brought to us and made available in the manner we want to employ it? As we enjoy that last minute rub-down, we are reminded that the towel was produced by equipment made possible by our foundries.

*Executive Secretary, Foundry Equipment Manufacturers Association.

Arthur J. Tuscany

So it goes with every single activity we undertake throughout that day or all the days and nights following. Without the use of castings it is hard to visualize how food could be produced and brought to our cities; how we could transport ourselves from one point to another; how we could operate our manufacturing establishments, offices, hospitals, or any other activity.

"Most revealing," you may say. "I never thought of it in just that way!" There we have put our finger on something. *We have never thought of it just that way.* Those of us in our own industry have not and do not appreciate the very necessary part our product is playing in our daily life.

Foundry Contribution Great

We have failed to recognize properly the importance of our own contribution in the war effort. I wish to emphasize to every member of the foundry industry the valuable, important, absolutely necessary part which you and your industry are playing in winning the war. I pay tribute to your industry and the contribution you are making in the war effort.

As winning the war is the most important thing confronting the world today, nothing should be permitted to interfere with our putting forth every ounce of energy toward that necessary objective.

Closer Cooperation Needed?

Let us next look at the possibilities for closer cooperation between the different branches of the foundry industry and those who have contact with this large, basic, necessary field of activity.

In determining how our effort might produce better results, we should consider the industry's position in the governmental organization known as the War Production Board, as this Board is a vital part of all business today. WPB has a number of sections, departments and units. The theory back of the establishment of these departments was that the different industries should have a section the size of which would perhaps be determined by the industry's importance in the war effort.

Lack of Recognition

We find that what was originally the "Iron and Steel Branch" has more recently been known as the "Steel Branch." Contact with the lumber industry is made through the "Lumber Branch," copper problems are handled through the "Copper Branch," etc.

What do we find with reference to castings? Castings are grouped with another and competing manufacturing process to form the "Castings and Forgings Branch."

The fact that castings are not more clearly recognized in WPB is a situation which is largely the fault of those in the industry. Stated briefly, the situation is: Our industry has the immobility of large numbers of small-

er units and an inarticulate inability to tell our story to engineers, engineering students, production men and the public. Our outlook has been parochial in the extreme and we are now suffering one of the consequences, in the situation brifly described, in the lack of industry recognition in the necessary board set up to administer so much of the war activity.

You have only to look at the position of other industries to find that their activity over the past has placed them in a very different position from the standpoint of the acceptance of their importance by the organization mentioned.

A Spur to the Future

The fact that the effort made to bring about closer working arrangement by the four branches of the foundry industry did not succeed, is a most regrettable situation. Of even greater importance is the fact that our war effort is suffering through this lack in our industry.

If the industry had enjoyed a better understanding over the years, the attainments of castings would now be more definitely recognized and our facilities and abilities more generally recorded which, in itself, would have placed our industry in a better position in the organization of the WPB. New plants have been erected to produce articles from other constructions that could have been made by the existing foundries of the country. This has meant delays, which in turn means continued suffering and even death to untold numbers of individuals throughout the world.

Now that we have observed the regrettable example of one manner in which our past derelictions are proving to be harmful, it is hoped that this experience will indicate the necessity for closer working arrangement among the four branches of the foundry industry so that, in the reconstruction period following the war, our products and those dependent upon them will not be lost in the shuffle. Surely no stronger evidence is needed than our recent experience to indicate the necessity for a change in front.

What is our industry saying to the world today about its accomplishments in the all-important task it is carrying?

Industry Needs Dramatizing

Personally, I find very little to enthuse about in the statements of any in the foundry industry. The war accomplishments of the foundry industry are stupendous. Certainly we have plenty to talk about, but we are saying, it seems, absolutely nothing about it. While I am not recommending that we step out and use this very unfortunate and devastating war as a publicity vehicle to boost our products, let's take a look at some other fields and see how they are going in these times.

As you read the advertisements of the automobile industry in the trade papers, on the billboards throughout the country, and listen to their radio presentations, you have, I am sure, the reaction of many: That the automobile industry is largely responsible for our progress toward winning the war.

Here we find one of the country's newest industries doing their customarily outstanding, aggressive job of keeping their product and its accomplishments constantly in the minds of our citizens. Certainly there is nothing wrong about this. I recognize the splendid, valuable contribution being made toward winning the war by the automobile industry and have no desire to detract from their glory one single bit. I use the example merely to show how an alert, progressive section of this country's business is again "missing no tricks."

Other Industries Cited

I would be remiss in this comment on the automobile industry if I failed to acknowledge that one of the few favorable mentions of the use of castings in this war is carried in a multiple advertisement of one of the larger automobile manufacturers under the section entitled "Castings and Forgings," in which there is described the conversion being made by a large malleable foundry subsidiary where castings are used to replace forgings.

Another example of industry foresightedness is indicated in the actions of the chemical manufacturers. As an industry, they are doing an impressive job in publicizing their war effort.

In the December issue of *The Foundry*, the editor very fittingly takes occasion to discuss the enviable record established by foundries during the first year of the war. He concludes this editorial with this statement: "But an industry which has been able to establish such a fine record should render even greater service in the days to come."

That statement summarizes the position of the foundry industry and those connected with it as of today. I should like to urge and suggest that foundry operators and those supplying foundries with materials and equipment determine how they might more satisfactorily cooperate to bring to a reality the full and complete assistance in the war effort in the days to come, the need for which has been so clearly set out in the editorial just mentioned.

What of the Future?

Bold indeed is the individual who would attempt to answer even some of the many questions which are being repeated from day to day. Nevertheless the shape of things to come is dimly evident. The dedication of practically our country's entire industrial machine to the prosecution of the war has taken about a year and is now nearing completion. Stoppage of plant construction, and the tendency to evaluate requirements of actual arms and munitions has shown that the construction phase has just about reached completion, and in a few cases may even have exceeded the country's needs. Even with the shift of things that has magnified the requirements for combat equipment of various and sundry types, there is a lag.

Some large aircraft plants are replacing hundreds of thousands of dollars worth of equipment, some of which is being revamped

to meet design changes. By and large we may say that the industrial mobilization for war is complete. No one knows how long the accent on war manufacture will continue any more than one knows when the war will end.

We can feel reasonably sure of one thing, and that is, when the war concludes, a re-conversion period will confront us. How long will it take us to unwind and change over the production of the thousands of items now under curtailment as "civilian goods?" I am one who feels that it will not take much more time than it did to get under way for war manufacture. Pressure of goods is likely to be as great, although of a different character.

We know the population at large is going to be starved for machines and gadgets. Our transportation system, from railroads to automobiles, will be pretty well worn out. I suspect that every man who turns in a gun is going to want to get aboard something and go some place else.

It seems logical to expect that the automobile industry will swing back first, with probably little immediate change in the first models. They will probably haul in the old machine tools and start manufacturing early to take the edge off the first hunger for new cars. The same thing will apply to the other thousands of machines for living, such as ice boxes, vacuum cleaners, washing machines, etc. Many of the "defense houses" will be crying for completion of living equipment such as furnaces, bath tubs, kitchen equipment and the like.

Effect on Capital Goods

Some of the equipment of war plants quite likely will be found working back through the used tool dealers to peace time manufacture, but thousands of the special purpose tools and equipment cannot be so salvaged. Certain plant structures such as cranes, furnaces, presses and so forth will be picked up and adapted to current manufacture.

Our private utilities—water, gas, and electric power—that are now bumping their heads against the WPB "No"—are going to need pumps, pipes, turbines, generators and what not. Farmers will need new agricultural machinery in quantities.

Tying this down, the outlook for the foundry industry would seem to be encouraging. There will be backed-up demands for all types of goods. Large interests will have huge plants and increased reservoirs of funds. The back-up of demand for repair parts for all types of machines will be noticeable and could have the effect of pushing more of this business out of the captive foundries that will be required to run full capacity for new unit requirements. But the foundries will also have most of the old and many new problems.

Competition Inevitable

Here is an important point. In the foundry industry we shall see a very large increase in the capacity for manufacturing light non-ferrous castings. Steel casting capacity will also have greatly increased. There will be an increase in the manufacturing facilities available for gray iron and malleable castings as well. A decided shift will have taken place in items of manufacture. Those foundries affected by limitation orders who were enterprising enough to secure other items for manufacture, will be an added factor.

Among competing industries we shall have with us a large capacity for producing forgings. A sizeable increase in the production facilities of various types of rolled steel will be available. Plastic in many forms will be offered. The new combination of wood and plastic bode more difficulties for foundries.

All of the government training which has been under way during the war by feather-duster apprenticeships which makes Winnie a welder in two months, has given a lot of good publicity to the welding process. Incidentally, I have not learned of an NYA or U. S. Employment Service school giving a corner to training foundry people such as molders or pattern makers, and the emphasis on aircraft where welding, pressing and so forth predominate has undoubtedly made its impression on the working public as well as the designer.

Aggressiveness Is Vital

On different occasions over the past, emphasis has been laid on the need for the foundry industry being more vocal and aggressive in the merchandising department of its business. If that was the situation before the recent upsurge in production facilities of castings of all types as well as competitive fabrications, what situation can we expect to find after the close of the war?

The facts are that casting manufacturers have done an outstanding job in improving their product. Some of the things being done in castings today were unthinkable a few short years ago. Various groups in the industry have much to their credit, as has the industry as a whole.

On the matter of merchandising its product, unfortunately, there is a different story to tell.

It is recited that in the early days of American industry foundry operators needed to give little attention to the matter of seeking customers. The customers, it seemed, sought the foundries. That may be one reason why casting manufacturers have been so traditionally reluctant to really sell their product on anything like the plane that other industries have.

Plan Now for Post War

The time is present to think and plan for the post-war industrial phase. I am convinced that an industry which has shown the progress and accomplishments in the methods of production, both scientific and technical, that has been achieved by the foundry industry, can also do an outstanding job of merchandising their product, if they will. The leaders of the industry should be thinking selling, actively and aggressively, with full emphasis on the best talent obtainable.

Whether this is possible cooperatively across the entire foundry industry as is done in other industries, I am not prepared to say. Experience seems

to indicate that it is impossible. If such is the case, let the various branches start toward the desired goal by doing a job individually but to the point of refraining from casting aspersions within the foundry camp. There is too much to be done to catch up with welding, stampings and other competitive constructions, to waste energy by "swinging" on one another within the foundry industry.

Future Planning Accepted

Up until just recently, it was considered not cricket, if not unpatriotic, to think of planning for the future. Our job as manufacturers was definitely indicated to us to keep producing more, more and more of everything to hasten the day when the United Nations could assume the war initiative. We were enjoined to forget future planning and thinking. Recently there has come a change in this direction. It is now once again respectable for manufacturers to engage in their customary, necessary practice of planning for the future.

It is interesting to note in passing that politicians, social reformers, farmers, labor unions and other groups have been planning plenty all through our war effort and are continuing today. An important thought is that if business does not do some planning of its own and have some things ready to present for ourselves, we may find others have assumed the job for us.

A favorable attitude of the federal administration toward planning is indicated in their tacit support of that planning for the future group known as the Committee for Economic Development, established with headquarters in the Department of Commerce Building, Washington, D. C.

Foundry Problems Not New

The particular problems which confront the foundry industry are the self-same problems which others faced in the past. There is nothing new in any crisis which might be facing the casting manufacturers. Other groups have been compelled to solve these very problems or disintegrate. Each one of them found the answer in the advantage of intelligent, cooperative effort—in doing a more constructive selling job on the part of the entire industry, with recognition of certain outstanding needs and the determination to conquer those needs through joint cooperation.

It is outstanding to note that wherever you find a successful foundry, you find an organization which has done two things —improved its product to the highest degree possible, then set out to do a really constructive merchandising job.

Cooperation Is Essential

The lesson is clear. It is possible to stimulate demand by making known the desirable features in a product or type of construction. It is possible to counteract successfully the factors which threaten the prosperity of an industry. It is possible to regain a position of national leadership through unified action.

In the nation-wide struggle for markets, the efforts of the strongest individual concern are powerless. Only through complete cooperation can an industry make its bid for the buyer's dollar.

The story of what American industry has done through cooperative action is one of the most fascinating, intriguing as well as brilliant pages in the history of our country. I wish I had the time to go through the entire story with you. It would be decidedly worthwhile, interesting and educating.

We will, with the close of the war, witness an entirely different type of competition than was prevalent some years back. More than ever, the individual concern will no longer be competing with an individual competitor. Rather, he will be competing with another industry seeking to replace his markets with their own materials.

We shall be witnessing the battle of giants. Along the battlefronts we shall find industry against industry. The individual company will be as powerless as the individual soldier in modern warfare. Let us consider a few instances so that we may more clearly recognize how we, too, can meet the situation which will be confronting us.

Everybody's Job

Perhaps many of you are thinking: "All this talk of selling does not apply to me personally. Others in my company are being paid to do that job."

There is where the foundry industry makes a big mistake. Selling is the job of *everybody* in an industry. When all those in the foundry industry reach the position where selling is uppermost in their minds, as is the situation in profitable and successful industries like automobiles, an important achievement can be recorded for your industry.

"What!" you say. Minimize technical phases of casting manufacture? "No, sir," I say. Bring selling up to a comparable plane with technical thinking. Until you do, you and your industry will lag and suffer.

It has been my privilege over the years to assist certain industries with their business problems. This consulting work has brought me in contact rather intimately with something over 20 industries. In working with companies, talking with their executives and employees, I am struck with the enthusiasm these people hold for their product. By contrast, the people in the foundry industry are veritable shrinking violets.

What is the outstanding feature in conjunction with the success of the joint effort of the many industries which had improved their lot by the employment of recognized methods in merchandising their product? It is very simple. It can be summed up in one word, namely, *Cooperation*. Too many people who call themselves business men look upon cooperation as something which runs one way only, with themselves on the receiving end.

Others Looking Ahead

These observations are one man's opinion. He may be unduly influenced by his past background. It is well, therefore, to

examine "the record" for other opinions.

In an address before the Sales Executive Club of Chicago last November, the president and editor of *Iron Age*, an important publication in the metal trades field, discussed merchandising. This speaker has the following to say about the future sales problems of industry, and his remarks fit the foundry industry:

"The future aspect of selling will begin when the war ends and believe me, it too will bring with it situations and conditions which will require new adjustments in turn. . . . Selling in the future is not going to be like selling in the present or selling in the past. 'Something different will have been added!'"

Sales Efforts Must Continue

One recommendation which has application in the foundry industry reads:

"You do not understand merchandising if you think selling is coincident with production. Selling leads production by a very considerable period.

"I think what is wrong with a good many of us in these peculiar days, when selling seems to be on the skids, is that we have acquired inferiority feelings. And that is something no salesman or sales manager can afford to have, now of all times.

"I ask you which of these two policies is going to keep a company in business after the war? That of deciding not to bother your customer with calls until the war is over, or that of deciding to give him real help while it is going on?

"And don't tell me that your business is different. There is no product or service that has been sold or is sold today, from lead pencils to locomotives, where the knowledge that you have or can get cannot be put to helpful use. If there is, you don't belong in that business. Either it is no good, or you are.

"So I say to you: 'Get busy and do a selling job on yourselves.' Sell yourself first and foremost on the necessity of your profession, in war as well as in peace. And then sell yourself on the necessity of knowing more than you have ever known before about your product and its uses; about the new people who are coming into the industry and business who will exercise buying influence and make buying decisions; about the changes that are taking place in both intra- and inter-industry capacity which affect future competition; and most important of all, on the necessity of getting a better knowledge of yourself.

"If you will do that, you can face the present and the future unafraid, and America can, too."

A Post-War Opportunity

In the January issue of *Industrial Marketing*, an editorial entitled "Trade Associations Can Be More Helpful" says in part:

"It is time that trade associations become vitalized and provide leadership to build their industries, and not be merely clearing houses for intra-industry activities. There are, as in all things, some notable exceptions; but generally speaking, too many associations are sadly lacking as a helping hand to their constituents in the marketing of their products and building the industry as a whole.

"The post-war problem which confronts every business and industry provides an unusual opportunity for trade associations to render valuable service to their members in their planning and preparation for marketing after the war. In this direction the organization can be a source of useful information on trends within its own industry and those which constitute the market for its products. Trade associations now lacking such facilities should set up the machinery for gathering these data by intensive research to provide the basic information on which individual companies may formulate plans for their special situations."

Industry Must Help Itself

The December 9 issue of *Wall Street Journal* carries an editorial entitled "Private Post War Planning." This editorial describes the possibilities and responsibilities of the trade association in assisting business, particularly "small" business units. This editorial states that these industries will either receive the help they need from sources within private industry or reluctantly resign themselves "to the untender mercies of self-appointed planners of a government directed economy." The article states in part:

"'God helps those who help themselves.' That must be the controlling principle for private enterprise if it is to save its life in the aftermath of this war. It will not preserve itself if only a comparatively few large enterprises are able to carry on, for such a condition would play directly into the hands of the planners of a government-controlled economy, the half-way house on the road to a totalitarian state."

Field of Trade Association

In mentioning trade associations in connection with this presentation, let me hasten to assure you that I am in no way casting reflection on any of the associations in the foundry field. It is my conviction that some excellent work has been done and is continuing to be done by trade associations in the foundry industry.

I refer to trade associations with the thought in mind that, after all, the policy of any trade group is the consolidated opinion of all the members in the association. In the degree that the members enable their association office to function or do the things which are really helpful and necessary to the industry, in that same degree will the members profit from their investment of time, effort and money in a trade association.

Now is the time to evaluate the entire industry situation and make plans to be made effective with the close of the war. The story is told that after Pearl Harbor it was generally accepted that our Navy had survived the worst naval disaster of all our history — immediately following which, we took the offensive. Our naval command took for its own the deathless remark that is attributed to Marshal Foch at the Marne:

> "My center is giving way, my right is broken. Situation excellent. I attack."

This same spirit exemplified by castings manufacturers can have but one result, and that is the result you would all like to enjoy!

Job Methods Training Plan Has Foundry Possibilities

ONE of the features of the session on Time Study and Job Evaluation held April 28 during the St. Louis Foundry Congress, was a demonstration of the new Job Methods Training program developed by the Training Within Industry Division, War Manpower Commission. This program, one of three now being conducted in war production plants all over the country, was designed to give plant supervisors some of the fundamental principles of improving the method of performing all manner of small jobs, by making the best possible use of available manpower, materials and machines.

C. T. Cardwell, acting district representative of T.W.I. in St. Louis district, introduced the demonstration and traced the development of the program, as well as the programs on Job Instructor Training and Job Relations Training. He pointed out that numerous jobs being done today, originally set up for small quantity production in peace time, still are being done by the same methods in spite of greatly increased production demands. Job Methods Training, he stated, enables the skilled workers to analyze and improve their own jobs.

Program Given in 10 Hours

The demonstration was conducted by C. F. Walther, assistant district representative of T.W.I. in St. Louis, who outlined the method used in conducting the program, which is presented in 10 hours, in five sessions of two hours each. Basically, the program consists of breaking down the job involved into small details, questioning and analyzing each detail by itself and in its relation to the job as a whole, and developing a better method from this analysis.

Mr. Walther stressed the fact that many minor details of production, frequently overlooked, or accepted through familiarity, may offer the greatest opportunities for improvement. The purpose, he said, is not to get a supervisor to attempt to improve a whole department layout or suggest major changes in product design, but to have him go after the 101 small jobs in his own department, as a regular part of his everyday job.

Applies to All Industry

Like the other T.W.I. training programs being offered, Job Methods Training is a streamlined, standardized plan which presupposes that the men best qualified to improve job methods are the men most familiar with those jobs. The program applies to any plant or industry, technicalities of operations or production not being involved in the training plan.

Worked out by leaders in industrial training loaned to Government work for the purpose, the plan is given without cost to all companies holding war production contracts or subcontracts. The actual training work is performed by experienced industrial men, specially trained for the work. Improvements of 200 or 300 per cent in production, with large decreases in scrap, idle machine time and fatigue, have been obtained in many plants where the program has been given, in many cases involving the improvement of jobs that have been done in the same old way for 15 or 20 years.

In sponsoring the demonstration at St. Louis, it is felt that the plan has wide application in the foundry industry. Chapters desiring further information, for possible discussion at their Fall meetings, should communicate direct with local T.W.I. offices.

Emergency Specs. for Alloy Steel Castings

THE American Society for Testing Materials has issued Emergency Alternate Provisions for A.S.T.M. Standard Specifications for Alloy Steel Castings for Structural Purposes A148-42.

Safety Plus at Caterpillar. Safety plaque presented to the Foundry Coreroom of Caterpillar Tractor Co., Peoria, Ill., for its record of no lost-time accidents during 1942. Of the 27 departments which compiled a similar record, the Coreroom was rated No. 1 by reason of having the greatest total number of working hours. Right to left: M. J. Gregory, factory manager of the foundry division, and National Director of A.F.A.; Stephen Garry, foreman; Robert Hodgson, general foreman; Edward Powell, union safety committeeman; H. S. Simpson, safety engineer.

These Emergency Alternate Provisions supersede those issued February 24, 1942.

The date of issue of the new Provisions is April 27, 1943, and the designation is EA-A148a. Changes made refer to Classes B and C of Section 1. Changes also have been made in the mechanical property requirements.

Copies of the new Emergency Alternate Provisions may be obtained from the offices of the A.S.T.M., 260 Broad St., Philadelphia, Pa.

New A.F.A. President Calls for Volunteers

L. C. WILSON, Reading Steel Casting Div. of American Chain & Cable Co., Reading, Pa., and president of A.F.A., in his editorial last month, emphasized the necessity of continuing work in developing the processes and products of the foundry industry. He now asks members of the Association to volunteer for work on committees in which they may be interested.

A list of the various committees of the Association may be obtained from the National Offices at 222 West Adams St., Chicago, and those wishing committee appointments should write to secure this list, which will be a guide to them in the selection of the committee activity in which they wish to participate. Request for enrollment on committees should be addressed to the Secretary, American Foundrymen's Association.

Here is an opportunity, especially for younger members, to increase both their contacts and their knowledge of specific problems in which they are interested and to learn what A.F.A. committees are now in existence.

Casts Grinding Balls In Revolving Molds

THE illustration on the front cover of this issue of *American Foundryman* illustrates a unique method of casting chill cast iron or steel balls, employing a rotary turntable containing 30 copper molds. Each mold section is interchangeable, the inner half being stationary, the outer half attached to a movable bracket held closed by means of a counterweight.

In pouring, the ladle (shown at right) is set at the correct position and the turntable of molds moves past it, metal flowing into a pouring trough lined with green-sand refractories. As molds are poured they revolve until reaching a point approximately 180 degrees from the pouring station, where the molds open and the balls drop out. The molds then remain open long enough to allow for inspection and blowing out before re-casting in the continuous operation involved.

Because each ball has a short feeder head, and means are provided to keep the metal in the head fluid until that in the chill ball has solidified, it is claimed that balls can be produced free from shrinkage and gas cavities. The process was developed and is employed by P. M. Payne & Co., Denver, Colo.

E. H. Ballard Retires After 50 Years Service

PAST President E. H. Ballard, General Foundry and Pattern Shop Superintendent, General Electric Company, West Lynn, Massachusetts, retired from active service May 31 following completion of nearly 50 years in the foundry industry. For the past 15 years and more he has been in charge of the foundries and pattern shops of the General Electric plants at Lynn and Everett, yet still found time to be exceptionally active in advancing the foundry industry through continuous participation in cooperative activities.

E. H. Ballard

Following service as a director of A.F.A., he was elected Vice-President in 1931 and served as President in 1932. During his term as a national officer of the Association his wise counsel, judgment, and sympathetic understanding caused him to be held in high regard by thousands of foundrymen throughout the country.

Born in Hartford, Conn., in 1875, Mr. Ballard first became connected with the foundry business in 1894 when he became a clerk in the newly organized foundry department of the former Thomas-Houston Electric Co., Lynn, Mass., with which his father was connected. There he was given an opportunity to obtain special training in the laboratory and general foundry experience. In 1905 he resigned to become superintendent of the Massachusetts Steel Casting Co., at Everett, which company was later absorbed by the General Electric Co., with whom Mr. Ballard remained continuously until his retirement.

In the words of the plant bulletin announcing his retirement: "He has the respect and admiration of foundrymen throughout the country, and is held in the highest esteem by all of those who have been privileged to be associated with him."

In addition to his A.F.A. affiliation, during practically all the time of his foundry connection Mr. Ballard was actively affiliated with the New England Foundrymen's Association and is a Past President of that organization. Mr. Ballard's home is at 22 Farragut Road, Swampscott, Mass. He will spend his summers at a country place 100 miles north, near East Wolfeboro, N. H., and now probably is busily engaged in nursing a Victory Garden.

Gray Iron Foundry Classifies and Prepares Scrap for Cupola Melting

By Karl J. Hepting,* Hamilton, Ohio

ONE of the most interesting and educational by-products that has come out of the tremendous industrial production for war is the change in the nature of iron and steel scrap which foundries have had available, and the new methods by which they have been forced to acquire, prepare and use it.

We of the Hamilton Foundry & Machine Co., priding ourselves on the quality of castings we produce, built a reputation for being ultra-particular in the acceptance of scrap and used only new or completely stripped automobile cast and standard section open-hearth tee-rails cut to short lengths. We went so far as to exclude Bessemer rail, light-section material, or any dirty or corroded stock which might ordinarily be expected to be shipped with railroad rail.

Scrap Quality Goes Down

In the second half of 1941, when scrap supplies were becoming extremely tight, our purchasing department prevailed upon our metallurgists to accept limited quantities of new heavy steel plate, structural and bar ends as a substitute for rail. This departure from our regular practice was done with some difficulty, and a great deal of reluctance on the part of our men who are responsible for the metallurgical control.

Nevertheless, as the scrap situation became more critical, the restrictions were removed one by one, while at the same time customs and foundry practice were adjusted so that the lower grades of scrap could be used without any deterioration in the high quality castings which the Hamilton plant has produced for more than a half century.

As stated, the quality of our scrap moved in inverse ratio to the over-all demand for scrap, and it is a matter of record that during 1942 the scrap demand was at an all-time peak, which indicated to what depths the quality ultimately dipped.

Prepares Scrap

So that we could obtain sufficient supplies in competition with other consumers in our vicinity, we worked out, with the cooperation of our regular scrap supplier, a preparation yard in which we could prepare practically all grades of scrap. This was found to be necessary as we moved down from rail to plate and structural scrap, and eventually to mixed agricultural, industrial, automobiles, and finally the salvage or household scrap which was brought out through the newspaper campaign in the fall of 1942.

At the same time, the quality of the cast iron which we were able to buy in the open market moved from new or entirely stripped motor blocks to mixed cupola cast, unstripped motors, stove-plate scrap, breakable cast and, for that matter, any mixed, prepared or unprepared cast scrap currently available.

Regular Channels Used

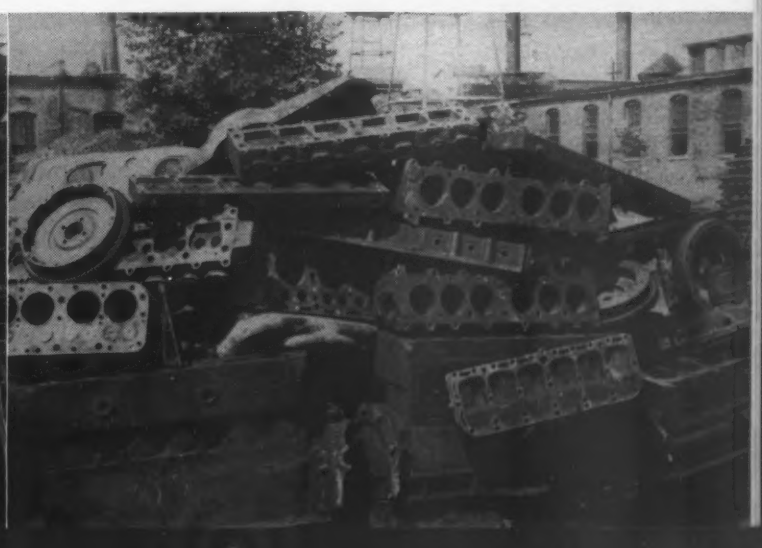
At this point it should be stated that in our entire operation, not one ton of prepared, unprepared, segregated or mixed material was purchased except through scrap dealers and brokers.

Through employment of our preparation equipment, which consists of a small crane for unloading, a drop for breaking cast, torches and shears, and most important of all, the "know how" of trained scrap sorters, we have been able to utilize more than 95 per cent of all material delivered to us.

The only exceptions to this have been body and fender scrap which resulted from the handling of whole junk automobiles, and the non-ferrous scrap which came from this source, as well as

*Purchasing Agent, The Hamilton Foundry & Machine Co.

Results of a local Victory Scrap Drive in the preparation yard of Hamilton Foundry & Machine Co., Hamilton, Ohio. On such miscellaneous stuff as this, carefully sorted and graded, does victory for the Allies now depend, for peacetime scrap sources are dried up. Left—the original scrap mass as collected. Right—cylinder blocks, pipe, gears, etc., sorted and available for cupola charging.



Someone's cherished ornamental fence goes through the shears preparatory to serving the war effort via Hamilton's cupola melting furnaces.

from the preparation of ordinary mixed or unprepared lots. The body and fender scrap has been shipped to nearby open-hearth plants so that it can be hydraulically compressed and put into their own production, and the non-ferrous metals have been sold through scrap dealers for smelting and refining plants.

Plant Reclamation Work

Our latest effort to further the war program is the reclamation project into which we have entered to salvage the iron droppings from our refuse sand dump, by means of vibratory riddles and magnetic pulleys. This enterprise, if proved successful, should produce thousands of tons of iron for the open-hearth furnaces. No definite results can be announced at the present time, but the percentage of iron recovery would indicate a very substantial tonnage of scrap to be made available for the open-hearth furnaces, providing the salvaging cost is not excessive.

We are proud of what we have been able to accomplish in the solution of our scrap problem, but look forward to the day when we can discontinue our preparation yard and again buy the prime grades of material with which we have a minimum of difficulty and no extra concern to our purchasing, metallurgical or operating departments.

That we have been able to maintain the quality of our castings throughout this change is a tribute to our metallurgists and foundrymen and another answer to the Axis charge that we are "spoiled by easy living."

Laboratories Confer On High-Temp. Work

IN ACCORDANCE with the program laid out by the Subcommittee on Physical Properties of Steel Foundry Sands at Elevated Temperatures, the first step of which is coordination of procedure between the laboratories of Cornell University, Ithaca, N. Y., and the Naval Research Laboratory, Washington, D.C., the second conference between the members of the staffs of these two institutions was held in Washington, June 11 and 12. Cornell University was represented by Dr. H. Ries, technical director, Foundry Sand Research Committee of A.F.A. and Douglas C. Williams, A.F.A. research fellow doing the actual testing work at the University. Preliminary checks on procedure, as conducted on samples of the same sand, indicate close agreement between the two laboratories.

Electric Steel Men Plan 2-Day Meeting

THE 1st Annual Conference of the Electric Furnace Steel Committee, Iron and Steel Division, American Institute of Mining and Metallurgical Engineers, will be held October 1-2 at the Hotel William Penn, Pittsburgh, it has been announced. All phases of basic and acid electric furnace practice will be covered at the 2-day intensive session, being arranged under general chairmanship of C. W. Briggs, Steel Founders Society of America, Cleveland.

A joint session on basic and acid practice will be held all day October 1, covering the development and present status of the industry, electric furnace design, refractories, electrodes, and raw materials. The evening session will be featured by a talk by a leader of the industry.

On Saturday the meeting will split up into sessions on basic practice and on acid practice, with many important developments in melting and oxidizing, deoxidizing and refining scheduled for discussion in view of present conditions.

Through preparation equipment that includes a drop for breaking cast (here caught in mid-air), torches and shears, and trained scrap sorters, more than 95 per cent of all scrap delivered is utilized.

Non-Ferrous Founders Form Own Trade Group

A NATIONAL trade association for non-ferrous foundrymen was recently established with formation of the Non-Ferrous Founders' Society, maintaining headquarters at 111 W. Washington St., Chicago, and with a Washington Office in the National Press building. The society, of which Chester K. Faunt, Christensen & Olsen Foundry Co., Chicago, has been elected president, is at present engaged in work concerning priorities under the Controlled Materials Plan, and other government regulations.

Other officers elected to head the new organization are E. W. Horlebein, Gibson & Kirk Co., Baltimore, Md., vice-president, and R. M. McClure, secretary-treasurer.

Belle City Malleable Iron Co. and Racine Steel Castings Co., Racine, Wis., recently announced the election of the following new officers: R. James Swartout, vice-president; Lester W. Brann, treasurer, and H. A. Thorson, assistant treasurer of the company.

Why Foremen Should Understand and Use Timestudy as a Production Tool

By Phil Carroll, Jr.,* Maplewood, N. J.

The following article, copyrighted by the author and reprinted with his permission from Manufacturing and Industrial Engineering, deals with the importance of timestudy in any wage incentive plan, and shows how a knowledge of timestudy will help the foreman iron out shop grievances, assure his men fair earnings, and help him do a better job of management. In a previous article by Mr. Carroll in the October, 1942, issue of American Foundryman, "Time and Motion Study for Foremen," simple steps were outlined for the foreman to follow in making his own time studies of jobs within his jurisdiction. The present article is a chapter from a forthcoming book on this subject.

TIMESTUDY is one of the most important tools of modern business. It is the foundation of what is sometimes called "scientific management." For that reason, every foreman should understand how to use it. Every foreman needs to make himself as expert with timestudy as with the other tools in his department.

Important as timestudy is, many foremen do not understand how to make the maximum use of it. Some foremen training courses touch upon it but briefly. Apparently, other subjects seem more necessary. Consequently, too little time is given to teaching timestudy.

However, many of the subjects taught are not nearly so useful to the foreman of the average department. He can make practical use of timestudy knowledge every day. Therefore, a simplified explanation of how to make and use timestudy will be of real value to every foreman.

Term Means "Study of Time"

Perhaps the word timestudy would be more easily understood if it were called the study of time. Time is all-important, and yet it is left out of the three-word description of the foreman's responsibilities. They say that a foreman is expected to properly combine "equipment, material, and men." Those three taken together without time would not turn out very much production.

Of course, it may be argued that the "men" part of the expression was meant to include time, but both are needed. In reality, it is the skill of the workers applied during work time that counts. The amount of skill alters the time required to do the job, so that the length of time becomes a factor. Here is where timestudy comes into the department.

Timestudy is a comparatively new tool, being only about 60 years old. Its counterpart, incentive, however, has been with us almost from the beginning of history. Today, the two go together to provide sound wage incentive plans.

The ambitious foreman should understand costs so that he can explain them to workers and do a better job of managing his department. Time costs money, and timestudy is basically a study of the "time cost" of each job.

All modern incentive plans are based upon good timestudy practices. Time study started primarily because more output had to be produced with the men and machines available. That same problem exists today. It is always a factor when the demand for production increases more rapidly than men can be trained and machines built.

Must Control Time Cost

We never seem to have enough time; something is always happening to make the time element too short. On the other hand, it may be just as well that we do not have all the time we need.

Time costs money. As a matter of fact, it is probably the largest cost in the department over which the foreman has control. Material may cost more, but as a rule, the foreman has control of the scrap only. Therefore, it is necessary that the foreman learn how to control the very large "time cost."

If time in his department is excessive, he may be out of business. That can happen because foremen in the plants which make competing products are studying ways to control time costs.

Understanding how to study time is a necessary part of the modern foreman's job. The reason is, that an important part of the "American Way of Life" is our high standard of living. A high standard of living means that our money will buy more. That can be helped in two ways; both are present.

Costs are decreasing and wages are increasing. Timestudy is making an important contribution to this progress. Timestudy helps by pointing out the "lost time" and by providing the basis for incentive earnings.

The Wage Incentive Plan

Wage incentive improves the standard of living by creating the opportunity to increase earnings. Further, it helps in "our way of life" by paying the individual for what he does. Both of these results are greatly assisted by the foreman who understands how best to utilize timestudy.

These benefits are obtained in larger amounts as we improve our understanding of the method of operation under the incentive plan. Experts say that one of the important characteristics of a good incentive plan is that *"it must be understood."* This re-

*Management consultant, author of "Timestudy and Cost Control."

fers primarily to those who benefit by it.

Frequently, the foreman is included among those working on incentive. When that is the case, he benefits directly from the incentive plan. Perhaps if more foremen were on incentive, more would learn to understand it more quickly.

Plan Must Be Explained

Understanding the incentive plan is only part of the problem. It is not so much the plan itself. Most incentive plans are comparatively simple. It is the failure to explain it that causes the difficulty. There are lots of things we do not understand until they are explained to us. An incentive plan is like that. Until someone explains it to the foreman and the worker, how can they be expected to understand it?

The foreman may say that the timestudy man should explain how the plan works. Perhaps that is his responsibility. Nevertheless, it is the foreman to whom the men come with their questions. They ask the foreman what happened to their premium. They ask why they did not make as much as they expected to. They wonder why the standard time is less than the actual time taken during the timestudy. They say to the foreman that the "standards are too tight."

When the men ask questions about the incentive plan, should the foreman display his ignorance by saying "I do not know"? If he does, he should ask himself the question, "How can I expect to get ahead?"

Foreman Must Look Ahead

How can the foreman expect to get his boss' job if he does not understand as simple a thing as a wage incentive plan? It is no excuse that the timestudy man fails to explain. Maybe he does not know any better because he, too, was poorly trained. That is no reason why the foreman should let himself be held back from making progress.

Recently, we have seen a lot in print about "Foreman—the Forgotten Man." He was forgotten, all right, but whose fault was that? He can say that management should have trained him better. There is no denying that much could have been done to improve training methods. Much should have been done. Training has been sadly neglected.

However, the man who thinks enough of himself to want to be promoted should look to his own education in management matters. He wants to be management's representative. If he wants to be a good one he may have to prepare himself to hold his position. Management can give him the job and the title with or without training, but he must do something in order to keep it.

This is especially true of the vast number of supervisors who have been shoved ahead during the war expansion. Many had no previous training and, since promotion, have been too busy getting out production. Many are not being trained for their jobs. Many can't be bothered with developing themselves. These may wonder why they are demoted if production falls off later on.

They should be giving serious thought to insuring their upward progress. More training and study are necessary. In this endeavor, a complete understanding of timestudy would be helpful.

High Wages a Basic Goal

One of the first things that a foreman must learn about wage incentive is that all of its advantages depend upon the increase in the worker's earnings. In other words, timestudy, piecerates and incentives are not worth very much until after the workers earn "real money." The operators must "get theirs."

That is why the foreman must understand timestudy. He must know all about timestudy and the incentive plan in order to do his part in making certain that his workers earn higher wages.

Many factors bear upon the incentive earnings. The time on incentive is the first one to consider. It comes first because incentive earnings are usually determined as the difference between the "Time Allowed" and "Time Taken."

The time allowed is established from the timestudy. The time taken is the part with which the foreman must concern himself first.

Table I

Importance of "Time Allowed" and "Time Taken" in Establishing Incentive Earnings

Operation	*Standard*	*Pieces Done*		*Time Earned*
Drill Complete	42 min.	× 145	=	610 min.
(less) Time Taken	(8 hours)			480 min.
(equals) Premium time				130 min.

The time "on standard" is the time taken which is charged to the jobs or operations done on incentive. It is the time during which the worker can increase his earnings. Naturally, the more opportunity the worker has to earn premium, the greater will be his "take home."

However the time "on standard" is influenced by both the timestudy man and the foreman. Let's look at the foreman's part first. He can exert control over the way time is spent and greatly improve his departmental showing. At the same time, he can do much to improve incentive earnings. Here are some points to remember:

Where Time Is Lost

1. Time is spent to get done the productive operations, but also for non-productive work and delays.

2. Non-productive time can be very largely avoided by supplying the employee with the things he needs.

3. Some non-productive time can be eliminated by seeing to it that working conditions are kept up to shop standards.

4. Waiting time can be practically eliminated by better planning.

5. Delay time which should be controlled by the foreman is not usually included in the operation standard time.

6. Workers must be instructed to secure proper credit for all

delay time not included in the standards.

During the "lost time," the worker cannot earn premium. Much of this can be controlled by the foreman. It is right in this bracket that "piece work" did so much harm. Piece work paid the operator only for "just what he did." That was before a minimum wage was guaranteed.

Even with a minimum wage it is often seen where the operator earnings are lowered because of "time lost." Time is lost when the work is not planned so that the operator can "keep going." Material is delayed. Tools are not ready. Machines break down. These and other delays are controllable by the foreman.

Report Delay Time

The foreman should report all delay time. He may argue with himself that by reporting delays he is "cutting his own throat." That is true, from the narrow-minded point of view, but the man who wants to be a good foreman must begin to look at things in the same way his boss does.

The point is: "How can anybody tell how much lost time there is, if it is buried?" How can it be reduced and controlled until after it is reported? Also, the foreman wants to go a step further and realize that his workers must be given a fair deal. He loses along with the operators when he tries to hide his own inefficiencies. Besides, he must know that good timestudy standards do not include "delay time." Therefore, if delays are not reported, the amount of the lost time subtracts directly from the worker's premium.

On the other hand, the foreman is not being fair when he "pads" the delay and "off-standard" time. By reporting more "off standard time" than actually occurs, the foreman unfairly increases the premium paid for the time on standard. Premiums and bonuses are inflated. The incentive earnings get out of line.

Don't Set Top Limits

Some of these things are like changing the oil in your car. There is no definite check on it. Many times, and in many ways, the foreman can get away with phony reports which substantially raise the earnings of his men. That is another reason why he should know much more about timestudy. His knowledge would quickly change his mind about cheating.

The reason is obvious. When we try to get something for nothing, we usually lose out in the long run. In wage incentive, that often comes about when management foolishly sets a "top limit" on earnings. The foreman may rave and rant when such a thing happens, but he may be largely to blame.

Setting a top limit is perhaps the worst thing that can happen because it destroys incentive. In so doing, it hurts everyone.

Limiting earnings is often brought on because someone thinks that the workers are earning "too much money." Excess earnings can result from poor timestudies. Usually, however, excessive earnings are brought on by padding the records as has already been indicated, and by the failure to keep the standards consistent with the methods being used.

Table 2

Effect on Incentive Earnings of "Delay Time" Reported and Not Reported

		Time Earned	
		Delays Reported	*Delays Not Reported*
Produced—4.2 mins. × 135 pieces	=	568	568
(less) Time Worked (8 hours)	480		480
(less) Delay	25	455	
(equals) Premium time		113	88

Standards Should Be Flexible

Changes in method are taking place all the time. The wide-awake foreman knows that the methods and conditions in his department are changing, usually for the better. That is part of progress. No one would wish to stop or delay the making of improvements.

Improvements are important to the raising of our standard of living, but before such improvements can truly raise our standard of living, they must be reflected in reductions in cost. Obviously, there is no reduction in cost when the timestudy standards remain the same after the method has been improved.

Some foremen argue that keeping track of method changes is the responsibility of the timestudy department. So it is, but timestudy men are human and in many plants are just as busy trying to keep up with their work as the foreman is. Even if they could do it, timestudy men would have to police the shop in order to catch even a part of the method changes.

The foreman and the workers know when most of the improvements are introduced. Passing the buck to the timestudy department does not solve the problem. The foreman must realize his responsibility in this field. He must do his part. Moreover, he must know enough about timestudy to realize that failure to maintain consistency between the standard time allowed and the work done will make his job an increasingly unhappy one.

When to Change Standards

Without knowing anything about timestudy, some foremen kick to the timestudy man when they think the standard is wrong. That is what they should do, but most of their kicks have to do with "tight" standards. Many of the tight ones appear that way only because they are compared with "loose ones." Some of the loose ones are the result of poor timestudy. Many more are caused by method changes which were not reported at the time they were introduced.

Standards should be corrected whenever they are in error. Here again is where the foreman who understands timestudy will see what will eventually happen if he neglects to report changes in method. Failure to notify the timestudy department of improvements makes the foreman a party to "inflation."

Unfortunately, this inflation is very apt to be much greater in some jobs than in others. The possibilities are greater in some jobs than in others. This unevenness makes for inconsistency in earning opportunities. It creates the situation of "good and bad jobs."

Averaging the good with the bad jobs will not solve any problems. Letting some men pick out all the good ones will make the situation even worse. Obviously, consistency must be maintained or the incentive plan becomes unfair to some workers. To avoid this, standards must be changed when methods are improved.

Maintain Quality Standards

Another factor which has an important bearing on the "correctness of standard times" is the definition of quality. That is easy to see in terms of every-day life. For instance, the foreman's wife wants to get the brand of coffee she asks for and pays for when she goes to the grocery store. She does not want to get 20-cent coffee when paying for a 30-cent brand. She expects a certain standard of quality.

The same is true in the shop. The quality desired may be higher or lower than in some other shop, but a definite quality standard should be maintained in a particular shop.

Timestudy standards should conform to the work necessary to produce that quality. The time allowed should be fair. However, it becomes "loose" and unfair if the quality of work becomes poorer while the standard time remains unchanged.

If the foreman is to be a true representative of management, he must assume all of his responsibilities. While his main job is to get out production and look after the people in his department, he has an important duty toward all concerned, in the field of timestudy.

To be a manager, he must understand when the conditions are correct for the proper operation of his department. If the conditions are not normal, the time standards do not apply. These conditions have to do with the method, material, setup, supply, quality, and timekeeping. Only when all of these conditions are correct, do the standards apply to the operations. When conditions are not right, the timestudy department should be notified.

Cooperation Is Vital

Changes may affect standards which have been set or require that additional observations be made. These things are usually known by the foreman before the timestudy man hears about them. The foreman who cooperates will give the timestudy man a chance to keep standards up to date. He needs to cooperate because it directly affects the earning capacity of those in his department, but cooperation is a two-way word.

Premium earnings under a good wage incentive plan simply means that there will be extra pay for extra work. With a knowledge of timestudy the foreman can help his men increase their earnings.

The timestudy department must cooperate with the foreman by setting allowances or new standards for changed conditions. This is particularly true when extra work is required. Extra work requires extra time; if it is not allowed, the worker loses part of his premium. Here is where the cooperative timestudy man will make the extra effort to do his job instead of saying "let it go day work."

The timestudy man who wants to help will also try to get standards set for all jobs. He knows that the worker's opportunities to earn premium are dependent upon standards set. Therefore, he must keep day work at the minimum, but he needs the help of the foreman. He can't be in two places at once, so the foreman should give ample notice. Otherwise, the busy timestudy man may be forced to choose which job he will study. Being only human, he may choose to work with the foreman who helps him most.

Men Must Be Trained

Incentive earnings are affected by another factor. The skill of the worker is very important. Just as this is designed to teach the essentials of timestudy to the foreman, so should the foreman realize the importance of teaching the correct methods to his employees. Otherwise, they cannot be expected to earn satisfactory premiums.

The operator may not be earning bonus because he does not put forth the proper effort. Again, he may be trying but not succeeding because he has not been taught the correct method. Both must be corrected by the foreman. His job includes teaching and leadership.

Here again, a knowledge of timestudy would help the foreman to see that he should not cry "The standard is too tight." It may be, but the chances are that something else is wrong. Frequently, the fault lies with the foreman.

Don't blame the standard—

1. If the methods have been changed.
2. If the material is off-size or condition.
3. If the machine is poorly maintained.
4. If the worker has to hunt for supplies and tools.
5. If the next job is not ready to work on.
6. If the worker is not properly instructed.
7. If the timekeeping is not correctly done.
8. If the worker is not putting forth incentive effort.

All the points which have been brought out emphasize the necessity for getting the facts. Learning how to get the facts is an important part of the training the timestudy man gets.

By learning how to do the same thing, the foreman can do a much better job. He will also begin to make progress upward. An understanding of timestudy will enable him to make his department much more efficient. That, in itself, will do a great

deal toward advancing his position in the organization. Getting the facts will further help him in presenting ideas to the boss. The boss wants the answers, but they must be correct.

Suggest Improvements

Knowing how to interest the boss in new ideas is very necessary to the foreman who understands timestudy. That is because timestudy is one of the most fruitful ways for developing suggestions for improvement. Many can be adopted without incurring any expense. However, some require an O.K. on a requisition for a tool, jig, or fixture. Maybe the layout of the department must be rearranged.

Whatever the suggestion, the facts obtained by means of timestudy will be of great assistance in determining the gains to be made. These can be compared with the cost to make the change and help the boss to reach a decision. Here is where the "know how" will help the foreman sell the good ideas developed in his department.

Many of the suggestions will come from the workers. These should be handled promptly and utilized whenever they are economically sound. The time facts can be obtained from the timestudies of the operation being changed. The advantages of the suggestion can be calculated from the time elements. These can be compared with the costs to make the change. The net gain or loss will then be known.

Credit Where Credit Due

With these figures, the suggestion can be presented on the basis of facts. Action can be taken quickly, and correctly. Both are important from the standpoint of making understandable explanations to the suggestors. This can be done with confidence by a foreman equipped with the facts. With facts, the foreman would certainly give full credit to those who made good suggestions.

A good foreman will bend over backwards to see that those who make the suggestions receive the full credit. That principle of good leadership cannot be too strongly emphasized.

Another important part of timestudy is in learning how to approach the problem of making a change. The timestudy man recognizes that all of his work has to do with changing things. He knows also that it is normal for everyone to resist making changes. To succeed, he must learn how to get along with people and accomplish all of the tasks assigned to him.

Such training in the proper approach is likewise important to the foreman. He must know how to introduce changes to those under him and also to his superiors.

The difficulty with making changes is that the foreman will run up against the "can't be done" attitude. That is the first thing many people say when a new idea is advanced.

Resistance to Change

In this connection, it might be well to remember a true story about the Wright brothers. Even though they had made a successful flight in a heavier-than-air machine in December 1903, scientists, newspaper editors, and the War Department would not believe it for nearly four years. But the flight was successful, as we well know; the proof that something was done changed the attitude of only those exposed to the facts.

The foreman who is looking ahead will avoid saying "can't be done." He will want facts. He will probably request timestudies of the operations in question if he can't take them himself.

Timestudy has a direct bearing on the results accomplished by a foreman because it helps him to increase the earnings of his men, the production of good work, and the skill of the workers. By the proper analysis of work done, he can utilize the skill of those in his department to the utmost. Thus, he can guide the aptitudes of his workers into the jobs for which they are best fitted.

Proper job analysis will help him to correctly instruct employees in their work. With it, he can see the details of the operation. Then, he can teach the performance of these elements in their proper sequence or order.

Timestudy further assists the foreman in his ability to understand costs. Knowledge of cost is necessary to the foreman's training. It enables him to understand the relation between work done and dollars spent. This is exceedingly important to him.

With that understanding, he can do a better job of managing his department. He can more readily understand the problems with which his boss must contend. Then he should be able to see that until he does understand cost, he can hardly expect to move up to the boss' job.

Clay Content Affects Fineness Test Data

By Dr. H. Ries,* Ithaca, N. Y.

IN THE A.F.A. Handbook of Testing detailed instructions are given for determining the fineness of sands, and it is pointed out that, if the sand contains A.F.A. clay substance, this must first be removed before the grain is separated on the sieves.

Neglect to do this will pro-

*Technical Director, A.F.A. Foundry Sand Research Committee, Cornell University.

Table I

Per Cent of Sample Remaining on Screens

Sieve No.	Sample 1 Dry	Sample 1 Wet	Sample 2 Dry	Sample 2 Wet	Sample 3 Dry	Sample 3 Wet	Sample 4 Dry	Sample 4 Wet
12	10.78	3.30	.....	.68	11.26	4.03	.03	.....
20	14.10	24.10	1.31	1.94	13.31	5.78	.06	.....
40	44.40	44.10	22.52	15.88	30.12	14.88	.92	.09
70	28.60	26.68	50.91	43.54	21.01	14.28	6.09	.72
100	1.36	1.02	11.10	11.58	4.01	2.88	16.37	9.00
140	.31	0.21	3.03	5.44	2.43	1.56	46.23	39.16
200	.07	.....	1.20	.80	1.77	1.44	26.01	36.26
270	.....	.....	5.14	3.34	1.74	1.92	1.77	.54
Thru 270	.05	.....	4.52	.88	12.73	14.50	2.51	2.12
Clay Substance	.....	0.49	.....	14.71	.....	40.35	.....	11.56
Total	99.67	99.90	99.73	98.79	98.38	101.62	99.99	99.45

duce quite different results, a fact that is brought out in Table 1 taken from A.F.A. *Transactions*, Vol. 32, part 2, p. 242 (1925). The figures, given in the table on page 15, emphasize the need for carrying out tests according to instructions.

Cost Committee Expected to Study "Over" Castings Problem

THE Association recently received an inquiry regarding the manner in which non-ferrous foundries handle the "over" castings problem. This letter outlines information desired by one company, and is as follows:

"We operate a non-ferrous foundry and machine shop and are disturbed by the accumulation in our stores of miscellaneous parts. In addition to the production of our regular line, we do considerable jobbing work, and the parts of which I speak fall in the latter category.

"In the production of any article, we increase the size of the order by a safety factor to insure having sufficient pieces to fill the order. If the job goes well, and there are few defective pieces, we are faced with the problem of what to do with the excess. Shall we put them in stock, trusting that we shall get a repeat order one day, or shall we throw them back into the furnace and so rid ourselves of the troubles concomitant with carrying them on our records. Though the excess on any one job may not represent a considerable amount of metal, when all the jobs are taken into account, I believe the idle metal may be measured in tons.

"What do other manufacturers do? Do they go to the trouble of calculating the cost of storage, the cost of entering the item in their records, interest on the money invested, insurance, rent, etc., to determine whether or not storage is economically justified for any length of time?

"The problem does not resolve itself easily into one of straight economy, in my judgment, particularly in these days of overcrowded production schedules. We are all desirous of conserving hard-to-get materials, but once these articles are reduced to ingot, they cannot take shape again except in the orderly sequence of these same overcrowded schedules."

A copy of this letter was forwarded to the War Problems Committee of the chapter closest to the company's home office, and the non-ferrous member of that committee answered the questions posed, as follows:

"Your problem, we believe, is the same as faced by every jobbing foundry. The larger the foundry, the more serious the problem.

"In past years we likewise have increased our customers' orders to take care of possible rejects. The majority of our customers specify a certain number of castings and want no more or no less. With the resulting steady increase in over castings on hand, we quite soon reached several definite conclusions.

"If we placed an order in our foundry for the exact number of castings required, the delivery of the entire order would be delayed until the rejects are taken care of. Since the customer is the one who makes the demand for the exact quantity, we saw no reason why our foundry should be penalized for that reason. In other words, if the customer insists on a condition which will delay delivery to him, then there is no reason why the foundry should carry the burden of establishing a means of a quicker delivery at the foundry's expense.

"'Over' castings have a tendency of sticking with you until doomsday. The old proverb of 'out of sight, out of mind' applies. Nobody thinks of the over castings on hand except the boss, and when he does it is generally too late, as the order has already been made by the foundry.

"As a consequence, we do not make any overs. The exact quantities are run. Shortages through rejects are made up on reject slips handed back to the foundry by the shipping department, and as a result we must daily take care of short runs of orders to complete the jobs on hand.

"We do not doubt but what this method is expensive, but one very important point should be born in mind. This handling of short orders is a nuisance to the foundry and has a decided tendency to make them reject conscious. Also, quite often these rejects are slipped in at the end of the day when some molder has completed the job he was on and there is still an hour or so before quitting time. Having some one else make up another means that rejects have a correcting effect on the original maker of the castings.

"Your letter was a reminder to check the shipping room to see if some overs were around. There were. About 1,000 lb. go back to the melting room today. Next week we may or may not receive orders requiring some of these castings, but the great majority would have still been here at Christmas.

"I have enjoyed writing to you on this subject and hope telling my experiences will keep you from feeling alone in your problem."

In addition, copies of the correspondence have been sent to the chairman of the A.F.A. Cost Committee, and it is expected that during the year that committee will make a study of this subject. Those interested are invited to contact the chairman of the Cost Committee, R. L. Lee, Grede Foundries, Inc., 6432 W. State St., Milwaukee, Wis.

Ampco Metal, Inc., Milwaukee, receives the Army-Navy "E" flag at presentation ceremonies held at the plant, May 16. Left to right, holding the flag: C. J. Zaiser, President of the company; D. J. Ruppenthal, president of Employees Mutual Benefit Association, and G. K. Dreher, Works Manager and past-President of the Wisconsin Chapter of A.F.A. The award was presented by Lt. Col. Wm. S. McDuffee, U. S. Army Air Forces and accepted by Mr. Zaiser. Token pins for employees were presented by Lt. Comm. Miles E. Fraser, U. S. Navy, and accepted for the employees by Mr. Dreher, Rose Treutinger, J. D. Zaiser, Chas. V. Johnson, R. W. Uecker, and Mr. Ruppenthal.

Fineness of Clay-Free Sands Determined by Rapid Methods

By O. Jay Myers* and Robert Kattus,** Cincinnati, Ohio.

MODERN foundry practice necessitates careful sand control demanding daily screen analyses. The grain fineness number computation as prescribed by the American Foundrymen's Association consumes much of the time in obtaining a complete screen analysis. At only a small sacrifice of accuracy, the sand control laboratory of the Wright Aeronautical Corporation's midwestern plant has developed two methods for calculating the grain fineness number, radically reducing the time spent in this computation.

Exactly 50 grams of the clean dried sand are accurately weighed on a sensitive torsion balance and this material is transferred to the uppermost screen of a standard sieve nest. The screens are put on a Ro-Tap machine and shaken for 10 minutes; they are then removed and the quantity of sand retained on each sieve is weighed. The weighing error should not exceed ±0.5 per cent; if it is within this limit, the individual amounts retained on each screen may be multiplied by two to give the percentages that are retained.

The method for grain fineness determination as given by the American Foundrymen's Association consists of the following four steps:

(1) Multiply the weights or percentages of sand on the various sieves by appropriate factors.

(2) Add the products.

(3) Divide by the sum of the weights or percentages.

(4) The dividend is the American Foundrymen's Association grain fineness number.

By dividing the American Foundrymen's Association factors used in step (1) by 100 (the total percentage) *before* multiplication, steps (3) and (4) can be omitted. Table 1 shows a sample calculation (the top four screens omitted).

To speed up the determination of the Grain Fineness Number still further, a nomograph was constructed (Fig. 1), facilitating reduction of the multiplication to a more mechanical operation.

To use this figure, lay a transparent straight-edge or drawing triangle across the points on the outside two scales so that the percentage retained on each individual screen is connected to its respective U. S. Standard screen number. Read the product at the intersection of the straight-edge with the middle scale. Follow this procedure for the several screens in the nest, and the sum of these products is the grain fineness number.

Table 1

Sample Grain Fineness Calculation

U. S. Screen No.	Wt. Retained (Grams)	% Retained	A.F.A. Multiplier (100)	Product
40	.20	.40	.3	.12
50	1.45	2.90	.4	1.16
70	7.88	15.76	.5	7.88
100	18.28	36.56	.7	25.59
140	13.69	27.38	1.0	27.38
200	6.38	12.76	1.4	17.86
270	1.46	2.92	2.0	5.84
pan	.87	1.74	3.0	5.22
Total	50.01	100.02		91.05

Grain Fineness Number = 91

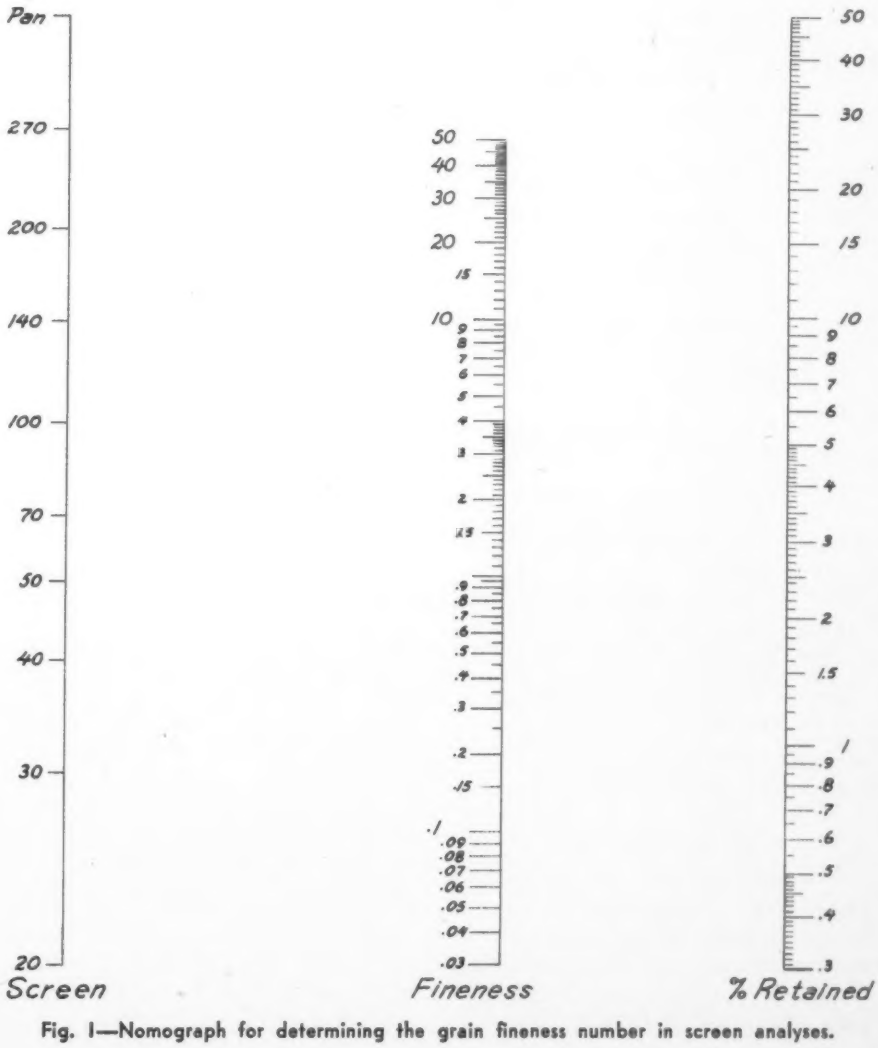


Fig. 1—Nomograph for determining the grain fineness number in screen analyses.

1. *Testing and Grading Foundry Sands and Clays*, 4th edition, p. 102, 1938.
2. *Idem*, page 103.

*Assistant Metallurgist, Wright Aeronautical Corp.
**Co-op. Student, Wright Aeronautical Corp.

New Members

(May 16 to June 15, 1943)

Sustaining

Atlantic Casting & Engineering Corp., Clifton, N. J. (Vinton Higbie, President).

Chesapeake Chapter

Nicholas Kowalcuk, Contract Employee, Naval Research Laboratories, Anacostia Sta., Washington, District Columbia.
Clausen A. Robeck, Gibson & Kirk Co., Baltimore, Md.
John A. Sterrett, President, Foundry Rubber Compounds Corp., Washington, D. C.

Chicago Chapter

William C. Cress, Research Ceramist, Armour Research Foundation, Chicago.
Gordon H. Curtis, Metallurgical Dept., Dodge-Chicago Plant, Chrysler Corp., Chicago.
Clarence C. Schlacks, Foundry Sales Repr., Chicago.

Cincinnati District Chapter

Robert Neiman, Director of Research, Whip-Mix Corp., Inc., Lousville, Ky.
Robert E. Schwab, Foundry Trouble Shooter, Wright Aeronautical Corp., Lockland, Ohio.

Detroit Chapter

Orlando Gonzalez, Student, University of Michigan, Ann Arbor, Mich.
John E. Lonn, Manager-Pneumatic Tools, Ingersoll-Rand Co., Detroit.
Ralph Walker, Detroit; Co-Partner, Buckeye Smelting & Refining Co., Toledo, Ohio.

Eastern Canada and Newfoundland Chapter

C. J. Converse, Assistant Superintendent, Crane Limited, Montreal, Que.

Metropolitan Chapter

Joseph W. Barnes, Supervisor of Pattern Equipment, Bendix Aviation Corp., Eclipse Aviation Div., Bendix, N. J.
John L. Carter, Newark, N. J.; Gray Iron Founders' Society, Cleveland.
Nicholas Marino, Coremaker, Wright Aeronautical Corp., Paterson, N. J.
Frank Scherzo, Superintendent of Hawthorn Foundry, Bendix Aviation Corp., Eclipse Aviation Div., Hawthorn, N. J.
Russell Symmes, Superintendent of Foundry, Bendix Aviation Corp., Eclipse Aviation Div., Bendix, N. J.
E. F. Thum, Jr., Assistant to Foundry Manager, Bendix Aviation Corp., Eclipse Aviation Div., Bendix, N. J.

Michiana Chapter

Clayton Hankins, Apprentice, Round Oak Co., Dowagiac, Mich.
Ralph D. Petcher, Foundry Superintendent, Weil-McLain Co., Michigan City, Ind.
***Round Oak Co., Dowagiac. (Harold W. Johnson, Factory Manager.**

Northeastern Ohio Chapter

***Apex Electrical Mfg. Co., Cleveland. (Frank Nemcik).**
John W. Hill, Oberlin, Ohio, Metallurgist, American Radiator & Standard Sanitary Corp., Elyria Works.
Milton Morris, National Aluminum Cylinder Head Co., Cleveland.

Northern California Chapter

J. F. Aicher, District Manager, E. A. Wilcox Co., San Francisco.
Lewis A. Dreyer, Production Manager, Vulcan Steel Foundry Co., Oakland.
Francis George, Manager, George Bros. Steel Foundry, Grass Valley.
***Kaiser Company, Inc., Iron and Steel Division, Oakland. (Alexander S. Blanc, Salesman)**
August F. Mainzer, President, Pacific Brass Foundry of San Francisco, San Francisco.
***Pacific States Steel Corp., Niles. (E. Sixtus, Jr., Metallurgist)**
W. R. Waelty, Sand Testing Laboratory, Joshua Hendy Iron Works, Sunnyvale.

Ontario Chapter

Thomas Cowden, General Manager, Wm. McPhail & Sons (Can.) Ltd. Vancouver, B. C.
***Ford Motor Co. of Canada, Ltd., Windsor, Ont. (W. R. Campbell, President)**
Sam Hewitt, Fittings Limited, Oshawa, Ont.
***Holmes Foundry Co., Ltd., Sarnia, Ont., (L. G. Blunt)**
Stephen B. Hutchinson, Toronto, Ont., Representative, Foundry Services Inc., New York, N. Y.
George Judd, Fittings Limited, Oshawa, Ont.
W. B. Millholland, Holmes Foundry Co., Ltd., Sarnia, Ont.
Alexander E. Sinclair, Secretary-Treasurer, Woodstock, Ont.
***Woodstock Machinery, Ltd., Woodstock, Ont. (Robert D. Sinclair, General Manager)**

St. Louis District Chapter

Samuel H. Shields, Melting Foreman, Walworth Co., Washington Park, Ill.

Southern California Chapter

Howard K. Brown, Sales, Kaiser Company, Inc., Oakland.

Western New York Chapter

G. F. Loud, General Production Superintendent, Harrison Radiator Div., General Motors Corp., Lockport, New York.
James E. Sharp, Metallurgist, Scott Aviation Corp., Lancaster, N. Y.

Wisconsin Chapter

John Cicero, Iron Distributor, Allis-Chalmers Mfg. Co., West Allis.
Frank Karpinski, Molder, Ampco Meetal, Inc., Milwaukee.
Frank A. Leszczynski, Foreman, Allis-Chalmers Mfg. Co., West Allis.
Frank Ruiz, Apprentice, Nordberg Mfg. Co., Milwaukee.

Outside of Chapter

***General Foundry & Machine Co., Sanford, N. C. (W. M. Herndon, General Manager)**
Gordon W. H. Marr, Director, Gordon Marr & Sons Pty. Ltd., Waterloo, N.S.W., Australia.
G. R. Webster, Esq., Works Manager, Britannia Iron & Steel Works, Ltd., Bedford, England.
H. B. Zimmerman, International Harvester Co. of Australia Pty. Ltd., Geelong Works, Geelong, Victoria, Australia.

*Company Member.

Book Review

Proceedings of the Institute of British Foundrymen, edited by J. Bolton, 7¼x9¾ in., cloth cover, 255 pages. Published by Institute of British Foundrymen, London, England.

Containing papers presented at the 39th General Meeting of the Institute, plus selected papers presented before branch meetings during 1941-42 season. General meeting papers include the 5th Edward Williams Lecture by Dr. H. W. Gillett, Battelle Memorial Institute, Columbus, Ohio, on "Foundry Teamwork," with a technical supplement on "Cupola Blast Control" by S. A. Herres and C. H. Lorig, Battelle Memorial Institute, the

latter published in the September, 1942 issue of *American Foundryman.*

A.F.A. Exchange Paper for 1942 also is included, by C. F. Joseph, Saginaw Malleable Iron Div., Saginaw, Mich., on "Arma-Steel."

Other General Meeting papers: "Production of Uniform Steel for a Light Castings Foundry," by C. H. Kain and L. W. Sanders; "Substituting of High-Duty Gray Iron for Steel Castings," by J. Blakiston; and Reports on Low-Tin and Tin-Free Bronzes and Brasses, by members of the Institute's Non-Ferrous Subcommittee of the Technical Committee.

Papers presented before Institute branches and included in the annual volume include: Pattern equipment for quantity production; control in a production foundry; electric steel molding problems; fuels and furnaces for heat treating steel castings; the Whiteheart process for malleable castings; wet process of core removal, casting cleaning and sand reclamation; sand casting of brasses, bronzes and P.M.G. metal; die casting; production problems of high-duty alloy cast irons; cupola melted high-duty cast iron; salvage and disposal of foundry waste; gating and risering of iron castings; production on diesel engine valve parts; molding valve parts for marine service; discussion of American synthetic sand practice and developments in cast iron.

C. E. Levoe Appointed to Battelle Staff

CLARENCE E. LEVOE, a recent graduate in metallurgical engineering of the Colorado School of Mines, has been appointed to the staff of Battelle Memorial Institute, Columbus, Ohio, and assigned to research on the high-temperature properties of metals. Mr. Levoe is a member of the American Society for Metals.

W. L. Woody Elected To Vice-Presidency

WALTON L. WOODY, A.F.A. National Director, who has been serving as assistant to the president, National Malleable & Steel Castings Co., has been elected vice-president in charge of operations of that company. His headquarters, previously at Sharon, Pa., have been transferred to the general offices in Cleveland.

War plant supervisors are told how to guide workers and to check on working conditions, so as to prevent on-the-job accidents, in a new pamphlet entitled "Safety Speeds Production," issued recently by the Department of Labor, through whom copies can be obtained.

Government Orders of the Day for Industry

More detailed information on any of the following news briefs may be obtained by writing direct to the U. S. Information Center, 1400 Pennsylvania Ave., N.W., Washington, D. C. For prompt reply, it is suggested that requests be made by Release numbers shown.

Materials

Clarify Aluminum Regulation. (WPB)—When controlled materials producer uses aluminum produced by him, it constitutes delivery of controlled material if converted or processed into other than a controlled material form, according to Directive 8 to CMP Reg. No. 1 *(Release No. WPB-3635)*

Copper Order Revised. (WPB)—Provisions of Copper Order M-9-c tightened, others found unworkable relaxed, and others clarified, in order amended May 18. *(Release No. WPB-3571)*

Magnesium Ingot Premium. (OPA)—Sellers of magnesium or magnesium alloy ingot in non-standard shapes and sizes may add premium of 1c per lb. to maximum base prices, if particular shape or size is requested, under Amend. 2 to MPR-314, eff. May 31. *(Release No. OPA-T-291)*

Ferrosilicon Priced. (OPA)—New pricing system and specific dollars-and-cents price ceilings announced for ferrosilicon and silicon metal under MPR 405, eff. July 1, in general maintaining existing ceilings. *(Release No. OPA-T-1024)*

Clarify Zinc Order (WPB)—Zinc Conservation Order M-11, as amended, has been issued, designed to clarify purchasing of zinc without allocation. *(Release No. WPB-3793)*

Product

Aluminum Pattern Rules. (WPB)—Procedure for purchase of aluminum patterns under CMP is set forth in Direction 1 to CMP Reg. No. 5, issued May 15, superseding instructions in CMPL-196, dated April 13. *(Release No. WPB-3549)*

Modify Castings Rule. (WPB)—Due to limited facilities, steel pit castings should be produced and machined whenever facilities available, even though in advance of need, under Inventory Direction 8 of CMP Reg. 2. *(Release No. WPB-3617)*

Safety

New Type Safety Shoe (OPA)—Women's safety shoes with plastic for fiber toe box added to types available through supplemental ration stamps, under Amend. 19 to RO-17, eff. June 3. *(Release No. OPA-T-960)*

Steel Valves Exempted. (OPA)—Steel valves, valve parts and subassemblies exempted from price control, also operations performed by new Navy sub-contractors in processing, treating or finishing such products, under Amend. 12 to Rev. SR-1, eff. June 7. *(Release No. OPA-T-999)*

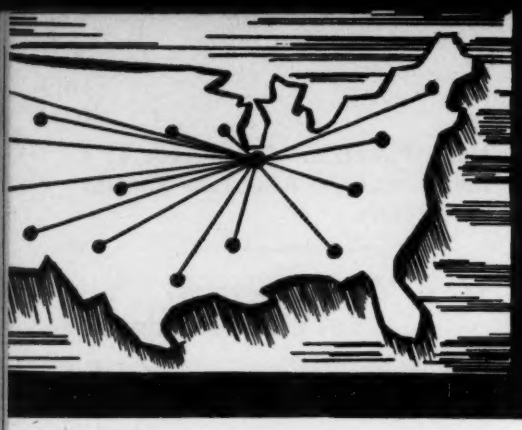
Scrap

Magnesium Scrap Control. (WPB)—Under M-2-b, magnesium scrap can be disposed of only by sale to producer or approved smelter, pointed out by Aluminum & Magnesium Div. May 18. *(Release No. WPB-3588)*

More Copper Scrap Sought. (WPB)—Director of Salvage Div. asks scrap and salvage operators for more help in locating and expediting movement of critical copper, brass and bronze scrap from trade sources. *(Release No. WPB-3702)*

Steel Scrap Pricing. (OPA)—Twelve changes in Rev. PS-4, designed to adjust pricing to changing conditions in iron and steel scrap, announced May 31 in Amend. 12 to RPS-4, eff. May 29. *(Release No. OPA-T-949)*

Copper Scrap Grades Set. (OPA)—Two new grades of copper alloy scrap, also maximum prices for each, announced by Amend. 1 to MPR-20, eff. June 10. *(Release No. OPA-T-984)*



Chapter Activities

Elections and Entertainment Draw 225 to Ontario Meeting

By G. L. White,* Toronto, Ont.

THE Ontario Chapter closed its season May 14 with an Entertainment Night and Annual Business Meeting, at the Roof Garden, Royal York Hotel, Toronto. Interest in this annual event was indicated by the excellent attendance of 225 members and guests.

T. D. Barnes, Wm. R. Barnes, Co., Ltd., Hamilton, Ontario, announced 17 new members inducted, after which Secretary G. L. White reported on the chapter's financial position. Chapter Chairman J. J. McFadyen, Galt Malleable Iron Co., Ltd., Galt, then installed the new Chairman, C. C. MacDonald, Frederic B. Stevens (Canada) Ltd., Toronto, and other newly elected officers and directors. In his introduction, Mr. McFadyen referred to the work of the chapter and its growth, and urged the members to continue taking an active part in its affairs.

Joe Sully, Sully Brass Foundry Ltd., Toronto, first chairman of the Ontario group, outlined the development of the chapter since its inception in 1938 following formation of a Canadian section the previous year. Other chairmen have been: D. J. Macdonald, Standard Sanitary & Dominion Radiator, Ltd., Toronto; D. M. Storie, Fittings Ltd., Oshawa, and N. B. Clarke, Steel Co. of Canada, Ltd., Hamilton.

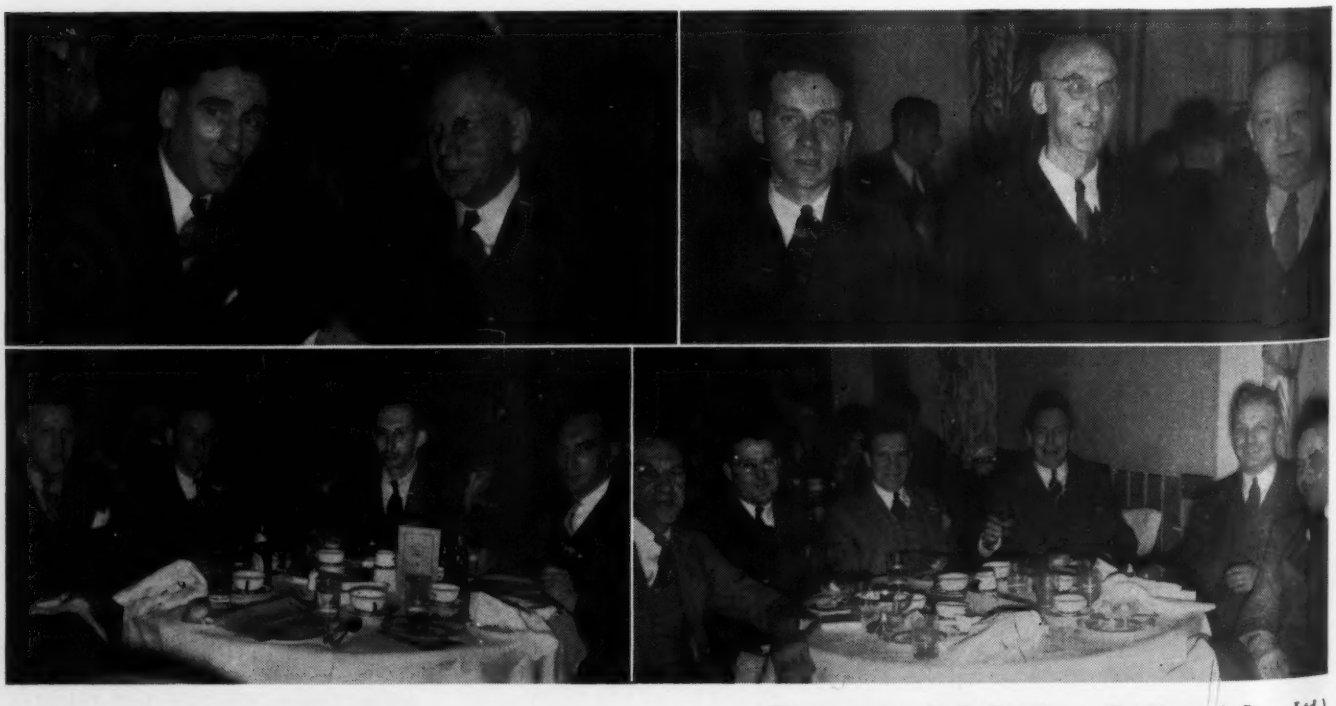
Following a reception, an excellent dinner and floor show were presented under direction of C. O. Williamson, Grinnell Co. of Canada, Ltd., as chairman of the entertainment committee. Some 30 companies contributed to the success of the occasion, a surplus of approximately $100 being donated to the "Milk for Britain" fund.

March Meeting

The March 26 meeting of the Ontario Chapter, held at the Royal Connaught Hotel, Hamilton, featured round-table discussions on gray iron, non-ferrous and malleable iron.

In the gray iron section, under chairman C. O. Williamson, Grinnell Co. of Canada, Ltd., a talk on "High-Test Cast Iron"

*Westman Publications, Ltd., and Secretary-Treasurer of the Ontario Chapter of A.F.A.



(Photos courtesy S. B. Hutchinson, Hutchinson & Sons, Ltd.)

Comradeship and relaxation, two mainstays of any Chapter meeting, was the rule at the May 14 Entertainment Night of the Ontario Chapter, the last meeting of the current season. Over 225 members and guests attended, and new officers and directors for 1943-44 were installed.

was given by W. J. Brill, Canadian General Electric Co., Ltd. Mr. Brill outlined his firm's practice in producing a particular high-test iron, parts made from this metal ranging from a pound to 8 tons. In the general discussion of foundry supplies that followed, many materials valuable to the foundry were mentioned.

E. G. Jennings, Office of the Metals Controller, Ottawa, took part in discussion of a variety of problems in the Non-Ferrous meeting, at which Tom Myatt, Coulter Copper & Brass Co., Ltd., was the main speaker. Mr. Myatt reviewed in detail the difficulties encountered in solving representative non-ferrous foundry problems.

The talk provoked much discussion. W. Loehr, Hahn Brass Co., Ltd., presented a matchplate problem, while A. Lawrason, Eureka Foundry & Mfg. Co., Ltd., spoke of the importance of sand control, particularly where silicon bronze is concerned.

In the malleable session, under leadership of J. Cunningham, International Malleable Iron Co., Guelph, Reg. Williams, McKinnon Industries Ltd., St. Catherines, Ont., described company practice in duplexing malleable iron for short-cycle annealing, and covered many phases of duplexing practice.

New England Founders Honor E. H. Ballard

By M. A. Hosmer,* Boston, Mass.

BY SPECIAL order of the board of directors of the New England Foundrymen's Association, the regular monthly dinner of that organization on May 12 was designated as a testimonial dinner to E. H. Ballard, General Electric Co., West Lynn, Mass., on his completion of 50 years of foundry service.

Mr. Ballard has been exceedingly active in the foundry industry and A.F.A. activities for many years, serving as Vice-President and President of the Association, and on the Executive Committee, in 1931-32. He first became connected with metal casting in 1894, as a steel foundry clerk, and retires as General Superintendent and Pattern Shop Superintendent of the West Lynn works of General Electric.

Fine tribute was paid Mr. Ballard at the May 12 meeting by A. B. Root, Jr., Hunt-Spiller Mfg. Co., and himself a past-President of A.F.A., and by Mr. Salmonsen, assistant manager of the River Works, General Electric Co. A. W. Calder, New England Butt Co., Providence, R. I., president of the New England Foundrymen's group, presided at the testimonial dinner.

The technical program for the evening featured N. J. Dunbeck, Eastern Clay Products, Inc., Eifort, Ohio, on "How to Change the Properties of Sand." Interest in the talk ran high and was followed by numerous questions from the floor.

*Hunt-Spiller Mfg. Co., and Reporter for the New England Foundrymen's Association.

Wisconsin Honors Old Timers, Apprentices

By H. E. Ladwig,† Milwaukee, Wis.

CELEBRATING their 4th Annual Old Timers and Apprentice Night, over 400 members and guests of the Wisconsin Chapter gathered at the Hotel Schroeder, Milwaukee, May 21. Chapter Chairman G. K. Dreher, Ampco Metal, Inc., presided and extended the welcome of the chapter to the several score of "old timers" present. Over 75 old timers of the district were invited to the meeting, all of whom have been connected with the foundry industry since prior to 1900. Some actually began their apprenticeships in the 70's and are still active today.

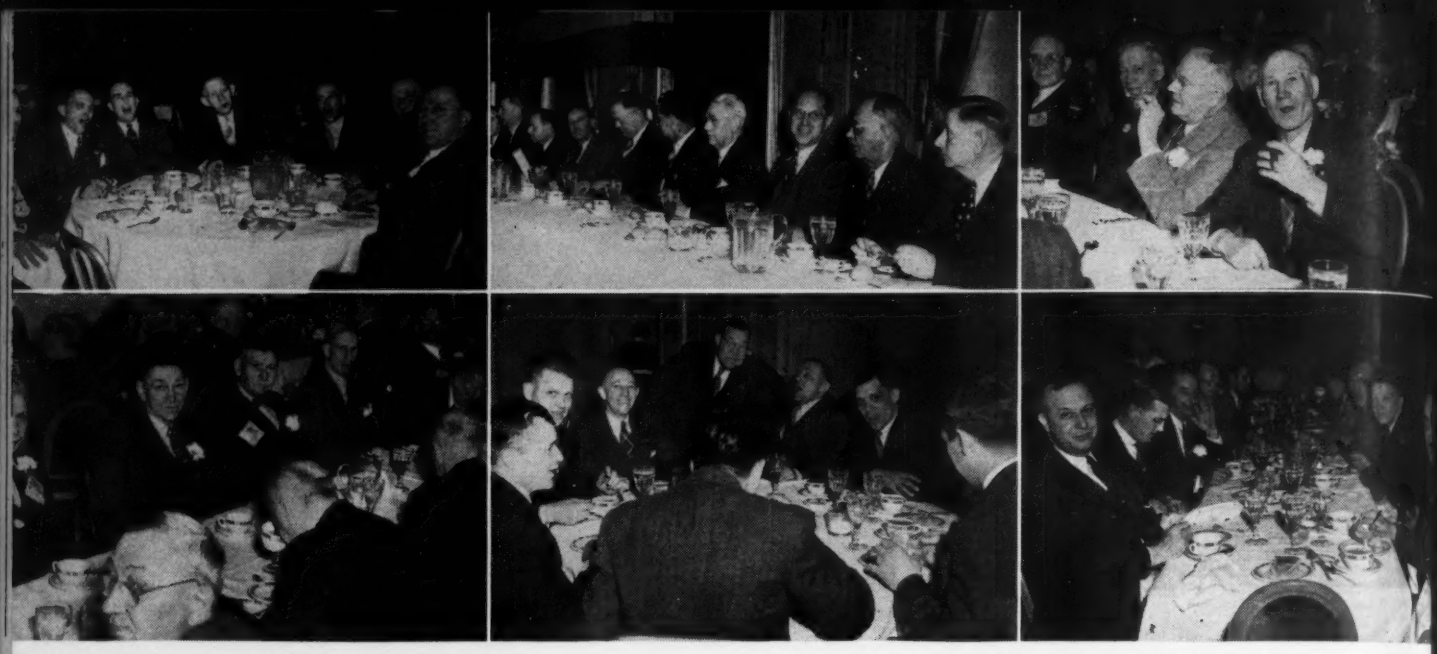
C. W. Morisette, Milwaukee Vocational School, as Chairman of the apprenticeship committee, presented awards to winners of the 1943 apprentice contests, both those held locally by the chapter for the district, as well as those held nationally by A.F.A. Mr. Morisette called attention to the fact that four apprentices from the Wisconsin area captured prizes in the national contests, one in the steel contest and three in the non-ferrous competitions.

(Photos courtesy Earl Bauer, Ampco Metal, Inc.)

Three interesting snapshots during the Old Timers and Apprentices Night of the Wisconsin Chapter, held in Milwaukee, May 21. Top—C. W. Morisette, Milwaukee Vocational School, presents a prize to one of the district's apprentices for his entry in the recent A.F.A. Apprentice Contests. Center—Three real "old timers," (Left to Right) Eugene Kueny, Sr., Allis-Chalmers Mfg. Co., who entered the foundry business in France in 1876; Peter Hott, retired, who began foundry work in 1873 in Germany; Rudolph Hicks, Allis-Chalmers Mfg. Co., whose foundry career dates back to 1888. Bottom —A few notables at the speaker's table, (Left to Right) Wm. Watson, Allis-Chalmers Mfg. Co.; C. E. Hoyt, A.F.A. Convention and Exhibit Manager; M. J. Gregory, Caterpillar Tractor Co., Peoria, Ill., National A.F.A. Director and main speaker of the evening; G. K. Dreher, Ampco Metal, Inc., President of Wisconsin Chapter; (standing) W. A. Hambley, Allis-Chalmers Mfg. Co.

The principal speaker of the evening was M. J. Gregory, Caterpillar Tractor Co., Peoria, Ill., and a National Director of A.F.A., who gave an inspiring talk aimed principally at the younger men attending. He pointed out that the old theory of foundry work requiring only

†Allis-Chalmers Mfg. Co., and Secretary, Wisconsin Chapter of A.F.A.



(Photos courtesy Earl Bauer, Ampco Metal, Inc.)

Old Timers' and Apprentice's Night, an annual feature of the Wisconsin Chapter's program of meetings, was held Friday, May 21 with "a full house" present. As these photos amply demonstrate, it was a happy and most entertaining meeting, at which many old timers of the Wisconsin district, as well as a large number of "young timer" apprentices, were honored.

"a strong back and a weak mind" is certainly far from true today. Mr. Gregory, who began his career as a foundry apprentice of Brown & Sharpe Mfg. Co., Providence, R. I., called attention to the opportunities in the industry today and stressed particularly the value of all-around knowledge and experience to the industry in meeting problems of today and tomorrow.

Birmingham District Elects New Officers

By H. B. McLaurine,* Birmingham, Ala.

ELECTION of officers and directors for 1943-44, and presentation of a paper on centrifugal casting of steel, featured the last meeting of the season for the Birmingham District Chapter, held May 21. Vice-Chairman W. Carson Adams presided in the absence of Chairman E. A. Thomas, Thomas Foundries, Inc., and presented the Chairman's report for the past year. Secretary Howard Nelson, Hill & Griffith Co., and Wayne B. Nelson, Young & Vann Supply Co., were delegated to draw up resolutions commending Mr. Thomas on his stewardship of Chapter affairs.

With the meeting turned over to J. A. Bowers, American Cast Iron Pipe Co., as chairman of the nominating committee, a slate of officers for 1943-44 was presented, the following being elected:

Chairman, W. Carson Adams; *Vice-Chairman,* R. L. Ogden, Stockham Pipe Fittings Co.; *Secretary-Treasurer,* Howard A. Nelson (reelected); *Directors* (newly elected) retiring Chairman E. A. Thomas; R. A. Donaldson, Woodward Iron Co.; R. R. Deas, American Cast Iron Pipe Co.

In accepting the chairmanship, Mr. Adams pledged his best efforts to the growth and usefulness of the chapter, and to promoting the interests of the foundry industry.

Chas. K. Donoho, American Cast Iron Pipe Co., presented a paper on "Casting Steel Centrifugally" at the technical session, illustrating step by step with slides the work and equipment employed by his firm in centrifugal casting of steel. The question period that followed was exceptionally lively.

*Reporter for Birmingham District Chapter of A.F.A.

Quad City Chapter Elects New Officers, Hears Carl Morken

By H. L. Creps,† Moline, Illinois

THE last regular meeting of the current season was held by the Quad City Chapter, at the LeClaire Hotel, Moline, on May 17, with 63 members and guests attending. Chapter Chairman Alex D. Matheson, French & Hecht, Inc., Davenport, presided.

The following officers and directors were elected by the chapter to serve during the forthcoming year, beginning July 1:

Chairman, W. E. Jones, Ordnance Steel Foundry Co., Bettendorf, Iowa; *Vice-Chairman,* R. E. Wilke, Deere & Co., Moline; *Secretary-Treasurer,* H. L. Creps, Frank Foundries Corp. *Directors* (3-year terms)—retiring Chairman A. D. Matheson; M. H. Liedtke, International Harvester Co., Rock Island, Ill.; C. S. Humphrey, C. S. Humphrey Co., Moline. In addition C. E. Von Luhrte, Chicago Retort Co., Davenport, was elected *Director* for a 2-year term, and Haydn Laycock, F. B. Stevens, Inc., Peoria, Ill., was elected for a 1-year term.

A permanent entertainment advisory committee was named, with the following personnel: A. E. Hageboeck, Frank Foundries Corp.; C. H. Burgston, Deere & Co.; A. H. Putnam, A. H. Putnam Co., Rock Island.

An excellent technical program featured a talk on "Cast Iron Ordnance Materiel" by Carl H. Morken, Carondelet Foundry Co., St. Louis, and technical consultant in the engineering section of the Ordnance Dept. Mr.

†Frank Foundries Corp., Secretary-Treasurer of the Quad City Chapter.

Morken told of efforts made to utilize more cast iron in ordnance materiel such as tanks, combat vehicles, small arms, artillery and ammunition. He stated that most ordnance engineers specify other materials than cast iron because of the latter's shattering characteristics, and offered a report of many tests that have been conducted in an attempt to find wider usage for cast iron in war production work. A number of questions were asked the speaker following his talk.

Twin City Honors Foundry Students

By A. S. Caswell,* Minneapolis, Minn.

NEW officers and directors of the Twin City Chapter took office at the annual meeting of the chapter, held May 21 at the Covered Wagon, Minneapolis. Retiring Chairman R. M. Aker, Western Alloyed Steel Casting Co., Minneapolis, opened the meeting, turning it over to the new Chairman, R. W. Bingham, American Hoist & Derrick Co., St. Paul, who presided thereafter. In retiring, Mr. Aker expressed appreciation for the fine cooperation given him by officers and directors during the past year.

The evening proved an occasion for honoring the foundry students who submitted entries in the 1943 A.F.A. Student Essay Contest, in which the 1st prize was awarded to Harry R. Dahlberg, University of Minnesota, for his paper on "The Effect of Graphite Particle Size in the Inoculation of Gray Cast Iron." This paper will be found elsewhere in this issue of *American Foundryman*.

Mr. Dahlberg, who was sent to the recent St. Louis Foundry Congress at the expense of the Twin City Chapter to receive his award, was introduced by Prof. H. F. Scobie, University of Minnesota, as the 1st prize winner in the local essay contest also. Other local winners were: 2d prize, Stanley Tingquist, with a paper on "Casting Design"; 3d prize, Arnold Satz, who wrote on "The Relationship of Surface Finish to Soundness in Gray Iron Castings."

Each of the student authors read his paper and was congratulated by the 78 members present.

It was decided during the meeting that nine meetings would be held during the coming season, with four round-table discussion nights scheduled, the other five sessions to be addressed by guest speakers of national prominence.

*Minneapolis Civic & Commerce Association, and Secretary-Treasurer, Twin City Chapter of A.F.A.

Southern California Chapter Elects and Hears A. W. Gregg

By E. M. Hagener,† Los Angeles

THE Southern California Chapter of A.F.A. held its May 20 meeting at the Elks Club, Los Angeles, with Chapter President Earl Anderson, Enterprise Iron Works, presiding. New officers and directors for 1943-44, as selected by the Nominating Committee, were unanimously voted into office, the following being elected:

President, Walter F. Haggman, Foundry Specialties Co., Huntington Park; *Vice President*, W. D. Bailey, Jr., Westlectric Castings, Inc., Los Angeles; *Secretary*, E. M. Hagener (reelected), General Metals Corp.; *Treasurer*, Robert R. Haley, Advance Aluminum & Brass Co., Los Angeles.

Directors (newly elected)—E. C. Hummel, Utility Electric Steel Foundry, Los Angeles; Wm. DeVaney, Pomona Pump Co., Pomona; Richard H. Hughes, Pacific Metals Co., Los Angeles; F. W. Bieck, Crown Pattern Works, Alhambra.

After Los Angeles delegates to the recent A.F.A. Convention in St. Louis gave their reports, the meeting was turned over to A. W. Gregg, Whiting Corporation, who presented an interesting talk on "Melting Steel by the Triplex Method." Mr. Gregg emphasized the point that with the changing of material specifications to meet war requirements, methods of melting steel must be carried out with exactness and control. Many questions pertaining to local problems were asked of the speaker.

An added attraction was the showing of a motion picture, "The World at War," comprising films from American newsreels and enemy zones.

April Meeting

A feature of the April 22 meeting of the Southern California Chapter, held at the Elks Club, Los Angeles, was an exhibit of patterns, cores and castings made

†General Metals Corp., and Secretary of Southern California Chapter.

A group of apprentices from Wisconsin Chapter area plants, gathered at the Old Timers and Apprentices Night of the Chapter, May 21, to be honored by the membership for their work in learning the foundry trade. Upon such young men as these, the foundry industry must depend to carry on in the future.

Some "old timers" in the foundry industry, honored at the May 21st meeting of the Wisconsin Chapter of A.F.A., the Chapter's annual Old Timers and Apprentices Night. Some of these men have been engaged in the industry for well over 50 years and are still active, some over 60 years, and at least one dates his continuous foundry experience back to 1876. With but a few exceptions, all are still active today, turning out tools for Victory.

by students in the foundry class at the Fullerton High School, Fullerton, Calif. The exhibit was presented by Ralph Wertz.

President Earl Anderson presided at this session and asked Mr. Wertz for highlights of the students' instruction course. Mr. Wertz stated that much of their good work is traceable to the cooperation of A.F.A.

Main speaker of the evening was John Wilson, Climax Molybdenum Co., on "The Metallurgy of Modern Cast Iron." Mr. Wilson, a member of the Southern California group, spoke on several local foundry problems and covered improvements made by the industry in general in raising the physical properties of cast iron by proper use of controlled and correct melting practice, pouring temperature, ladle inoculations and judicious use of alloys. The effects of alloying cast iron were illustrated with slides.

Through courtesy of the Aluminum Co. of America, an interesting motion picture on "How to Weld Aluminum" also was presented.

Cincinnati Considers Foundry Dust Control

By Henry M. Wood,* Cincinnati

FIFTY members and guests of the Cincinnati District Chapter held their regular monthly meeting May 10 at the Cincinnati Club, featured by an interesting talk on "Foundry Dust Control." Chapter Chairman Frank Hutchinson, Reliance Foundry Co., presided, and prior to the technical program offered the membership the slate of officers and directors for the coming year as prepared by the nominating committee, for election at the June meeting.

Guest speaker on dust control was John M. Kane, American Air Filter Co., Louisville, Ky., who outlined the increasing recognition that foundrymen are giving the problem of dust abatement. He presented a series of slides, first illustrating dust particles, their relative sizes, and the relation of small particles to the dust hazard. The speaker then illustrated methods of collecting dust from shakeout of small parts and from large castings, also from such places as elevators, belts, mullers and cleaning room equipment.

*W. W. Sly Mfg. Co., and Secretary, Cincinnati District Chapter.

New Officers Elected by Pittsburgh Group

By R. L. Hartford,† Pittsburgh

THE Williams method of blind head feeding was the subject of discussion at the April meeting of the Pittsburgh Foundrymen's association. John Williams, Dodge Steel Co., Philadelphia, who developed this so-called "firecracker-core" process of blind heading, described the methods used in his shop and answered questions on the process. The record attendance of about 160 foundrymen and guests entered actively into this discussion, which was led by Walter White, Pittsburgh Rolls Co.

Annual election of officers was held at this meeting and the slate of candidates proposed by the nominating committee was elected as follows:

President, E. C. Buerkle, National Bearing Metals Corp; *Vice-President,* Harry Kennedy, Continental Roll & Steel Foundry Co.; *Secretary-Treasurer,* Ferdinand G. Schultz, F. G. Schultz Co.; *Executive Committee:* H. P. Spilker, Sterrit Thomas Foundry Co.; T. A. Reynolds, McConway & Torley Corp.; C. J. Scheckhaus, Union Spring & Mfg. Co.; Thomas Baldwin, American Brake Shoe & Foundry Co.; and N. J. Kelly, Kelly Foundry Co.

†Pittsburgh Editor, *The Foundry,* reporting for the Pittsburgh Foundrymen's Association.

N. California Holds Special April Meeting

By Geo. L. Kennard,** San Francisco

SOME 67 members of the Northern California Chapter of A.F.A. held a special meeting April 30, at Leamington Hotel, Oakland, for the purpose of hearing A. A. Turner, Carborundum Co., Perth Amboy, N. J., on "Refractory Materials." The meeting was the second held in April, being called to accommodate Mr. Turner, who had promised several months ago to address the chapter.

In the absence of Chapter Chairman F. A. Mainzer, Pacific Brass Foundry of San Francisco, who was attending the Foundry Congress in St. Louis, Vice-Chairman Harry A. Bossi, H. C. Macaulay Foundry Co., Berkeley, presided. Program Chairman Serge P. Kovaleff, Enterprise Engine & Foundry Co., who has done yeoman service the past year in being responsible for the program of 13 meetings in nine months, introduced the speaker.

Mr. Turner spoke of the rapid progress made in the past 20 years by producers of clay, silica and basic refractories, and stated that modern metallurgy is dependent upon these improvements, both in regular and in super refractories. Films were shown dealing with development of newer types of fused cast re-

**Northern California Foundrymen's Institute, and Secretary-Treasurer, Northern California Chapter.

fractories, sections of numerous types of refractories being shown under polarizing microscope. The relation of crystalline structure to porosity was outlined, and the extreme density of the fused cast alumina block graphically illustrated.

One portion of the film was devoted to moving pictures taken at temperatures from 2000 to 3000° F., showing the attack of slags and glasses on specimens tested.

May Meeting

With 96 chapter members and guests in attendance, the Northern California Chapter held its regular monthly meeting May 21 at the Engineers Club, San Francisco. The meeting had been postponed one week to accommodate the guest speaker, A. W. Gregg of Whiting Corporation, Harvey, Ill.

Chapter Vice-President Harry A. Bossi, H. C. Macaulay Foundry Co., Berkeley, presided in the absence of President Fred A. Mainzer, Pacific Brass Foundry of San Francisco. Following the usual business, the report of the nominating committee was presented by the chairman, C. J. P. Hoehn, Enterprise Foundry Co., offering the names of nominees for election at the June meeting.

Serge P. Kovaleff, Enterprise Engine & Foundry Co., chairman of the program committee, introduced Mr. Gregg as the technical speaker, on the subject of "Steel Melting Methods." Mr. Gregg's talk was illustrated with numerous slides and a moving picture, and proof of the members' interest was shown by the number of questions asked.

A. F. Mainzer, at 75, Still Active Founder

By Geo. L. Kennard,* San Francisco

ONE of the oldest active members of the Association is a member of the Northern California Chapter, August F. Mainzer, president and founder of the Pacific Brass Foundry of San Francisco, who has been connected with the business for

A. F. Mainzer

60 years. Born in 1868 in Europe, he came to San Francisco in 1882 as an apprentice in the original San Francisco Zinc Foundry, which became Kremer Bros. & Co. in 1887, with Mr. Mainzer one of the partners in the Pacific Coast enterprise.

Originally engaged in casting zinc ornaments for residences of that period, it changed to a brass and bronze foundry prior to 1900, specializing in statuary and ornamental work. In 1912 Mr. Mainzer sold his interest and founded his present company, which now is engaged at full capacity on Navy and Maritime work. His son, Fred A. Mainzer, chairman of the Northern California Chapter the past year, now is in active charge of the firm, in which the elder Mr. Mainzer, however, continues to take an interest.

*Northern California Foundrymen's Institute, and Secretary-Treasurer of the Northern California Chapter of A.F.A.

Metropolitan Chapter Reports On Foundry Engineering Course

IT IS recognized by many thinking men of the industry that a large percentage of foundry employees today have had little or no training in the fundamentals of foundry work, due largely to rapid expansion of the industry and relocation of individuals in essential work. To remedy this situation, early this year the Metropolitan Chapter of A.F.A., through its local Committee on Cooperation with Engineering Schools, induced the Stevens Institute of Technology, Hoboken, N. J., to offer a course in the "Fundamentals of Foundry Engineering."

Results of the course were most encouraging and may well be considered by other metropolitan areas where a considerable number of foundries are located. The course began February 4 and continued to April 23, and since its completion at least five promotions have been given those attending, some receiving their promotions even before the course was completed.

The idea for such a course began last Fall when the Chapter contacted a number of schools in the area seeking entries in the A.F.A. Student Engineering Contest. It was found that little effort was made by the colleges to interest students in foundry engineering work, the principal courses offered dealing with physical metallurgy. One school offered shop courses in melting and making gray iron castings, but it was felt that none of the students were fitted for entering such a contest.

The real need for instruction in foundry fundamentals then was discussed with Prof. Alfred Bornemann, associate professor of engineering chemistry, and director of the Peirce Metals Laboratory of Stevens Institute. As a result it was decided that such a course could be offered in the Stevens War Industries School, a part of the Engineering Management Science War Training Bureau, Washington, D. C.

With this encouragement the committee worked out with the Institute a course in the fundamentals of producing good castings, confining the subject matter to operations common to production of cast metals in general. Ten topics for instruction were selected, the topics and their relative importance in the course being as follows:

1. Solidification and Cooling Phenomena. (3 hrs.)
2. Controlled Directional Solidification. (6 hrs.)
3. Pattern Design. (18 hrs.)
4. Sand. (18 hrs.)
5. Permanent Mold and Die Casting Practice. (3 hrs.)
6. Melting and Pouring. (19 hrs.)
7. Cleaning of Castings. (3 hrs.)

8. Reclamation of Foundry Materials. (3 hrs.)
9. Annealing and Heat Treatment. (3 hrs.)
10. Necessity of Proper Foundry Control. (6 hrs.)

The course consisted of 72 hours instruction over the 12-week period, with two 3-hour sessions per week. Outstanding technical and practical men of the industry were obtained as speakers on the various subjects, two hours of each session being in the form of coordinated lectures, with one hour for discussion and review.

Ninety individuals enrolled for the course, representing 40 different companies and comprising a cross-section of the industry. Ages of those attending ranged from 16 to 65, the average age being 32. As to education, 17 had never attended high school, 13 had some college training, and 19 had 4 or more years of college, their college degrees being gained in fields foreign to the foundry industry, however.

A number of the men had had many years of business experience, but very little in foundry work. There were molders, inspectors, draftsmen, metallurgists, salesmen, designers, contractors, statisticians, methods engineers and a number of other occupations represented by the previous experience of the enrollees.

The committee of the Metropolitan Chapter which assisted Prof. Bornemann in working out details of the course was headed by Fred G. Sefing, International Nickel Co., Chairman of the Chapter, and included the following members: T. D. Parker, Climax Molybdenum Co., chairman of the committee; W. C. Schulte, Curtiss-Wright Aviation Corp., and R. E. Ward, Eclipse Aviation Div., Bendix Aviation Corp.

Issues Booklet on Absenteeism Control

"CONTROLLING Absenteeism" is the title of 58-page special bulletin No. 12, issued by the Div. of Labor Standards, Department of Labor, to give war industries some practical information on reducing absenteeism. The report summarizes the experience of management in some 200 outstanding war plants in dealing with absenteeism, indicates methods of control tried, and degree of success obtained. Forms used by war plants in controlling absenteeism are shown in a supplementary pamphlet.

H. S. Hitchcock Dies

HARRY S. HITCHCOCK, for the past several years president of Apex Steel Corp., Los Angeles, and one of the early pioneers in the iron and steel industry of Southern California, died May 30, it has been learned. Mr. Hitchcock, formerly connected with Baker Iron Works, has been an active member of the Southern California Chapter of A.F.A. for a number of years.

Book Review

"Bibliography of the Literature Relating to Constitutional Diagrams of Alloys," by J. L. Haughton, Institute of Metals Monograph and Report Series, No. 2, 5½ x 8½, limp cloth, 168 pages. Published by The British Institute of Metals, 4 Grosvenor Gardens, S.W.1., London. Price 3s. 6d., post free.

This bibliography contains over 5,000 references to papers dealing with the constitution of binary, ternary, and higher alloy systems, both ferrous and nonferrous. References have been included not only to papers of a purely constitutional character but also to many x-ray and physical-property studies of alloys, which have some bearing on the constitution. To furnish some guide among the references, asterisks have been placed against those in the originals of which a new equilibrium diagram, or portion of one, is to be found.

The bibliography is thoroughly up to date and contains references to all papers seen up to the time of going to press. It should prove invaluable to all research workers in metallurgy, works' metallurgists, and others interested in the constitution of metallic alloys.

Book Review

Mechanical Drawing, by E. Kenison, J. McKinney and T. C. Plumridge, 5½ x 8½-in., hard cloth binding, 330 pages, 350 illustrations and charts. Published by The American Technical Society, Drexel at 58th St., Chicago, Ill. Price $2.00 per copy.

This book is written for the beginner in the subject of mechanical drawing but can be used to advantage by draftsmen as a reference book. The authors of this book are associated with the American School, Chicago, and their experience in teaching mechanical drawing in this trade school has led them to divide the subject logically into several divisions.

The authors begin by instructing the student in the use of the various drawing instruments and then in lettering, two of the fundamentals of mechanical drawing. Geometrical definitions and problems next are studied, followed by symbols and conventions. As the book progresses the subject matter becomes increasingly difficult, discussing such subjects as projection, sections, scale drawings, intersections, developments and isometric and oblique projection.

The text is profusely illustrated and a feature of the book is the series of problems which follows each logical division of the subject. This book appears to be an excellent text on mechanical drawing.

Supplementing a previous study of flake graphite, which is listed as one of the critical raw materials essential to our war program, the U. S. Bureau of Mines has issued a report on the oxidation or burning rate of this mineral, whose products frequently are subjected to high temperatures in use, according to announcement issued on May 6 by the director of the Bureau of Mines.

Abstracts

NOTE: The following references to articles dealing with the many phases of the foundry industry, have been prepared by the staff of *American Foundryman*, from current technical and trade publications.

When copies of the complete articles are desired, photostat copies may be obtained from the Engineering Societies Library, 29 W. 39th Street, New York, N. Y.

Cast Iron

CUPOLA DESIGN AND OPERATION. *(See Furnaces.)*

SHRINKAGE. *"Theory of Shrinkage in Gray Cast Iron,"* George A. Timmons, *The Foundry,* vol. 70, No. 12, December, 1942, pp. 82-3, 166-170. Shrinkage defects occur as a result of the contraction which accompanies the solidification of improperly fed metal. Whenever liquid metal is completely surrounded by metal which has already solidified, shrinkage will occur. Solidification of cast iron starts with the formation of austenitic dendrites. Later when the temperature has dropped to the eutectic temperature, the remaining molten metal, which is of eutectic composition, solidifies. However, there is insufficient eutectic metal to completely fill the spaces between dendrites, and shrinkage voids are formed. Risers may be used to feed sections in which shrinkage occurs. However, unless the riser is of sufficient cross-section to remain molten until the entire casting has solidified, it will not feed the casting. Four factors which greatly affect shrinkage in gray cast iron are: (1) The change in density accompanying solidification, (2) extent of the freezing range, (3) temperature gradients within the casting, and (4) location of feeders. Composition affects shrinkage inasmuch as it has the effect of altering the foregoing factors.

SUBSTITUTE ALLOYS. *(See Malleable Iron.)*

Centrifugal Casting

CENTRIFUGAL CASTING. *"Centrifugal Casting—II,"* Harold B. Zuehlke, *The Metal Industry* (London), vol. 62, No. 18, April 30, 1943, pp. 277-279. Centrifugal casting molds may be of graphite, cast iron, fire clay, or sand. Of these, graphite is the most satisfactory. Graphite, in the form used for furnace electrodes, machines easily, has a low cost, has a low coefficient of expansion, and is the only material in which castings of 80-10-10 or high phosphorus alloys can be made. However, the walls of a graphite mold wear rapidly, and the heat conductivity is high. Introduction of bentonite powder into the mold partially eliminates both of these disadvantages. Semi-permanent molds of fire clay have been successfully used for the production of a number of parts too small for molds, but castings made in sand are more difficult to clean. The amount of metal poured in a mold should be measured, for it controls the size of the bore in a casting. Pouring temperatures may be somewhat lower than those for gravity castings. It is essential that centrifugal castings start freezing at the outside and continue to freeze progressively toward the center. The size of casting which can be made centrifugally is somewhat limited by this requirement. Oxides and dross collect in the center of the casting, as do entrapped gases. Freezing should not be too rapid to prevent this separation. Centrifugal castings are sometimes cheaper than permanent mold castings, for the yield from the centrifugal process is greater and scrap losses are very low.

Corrosion

CORROSION RESISTANCE. *(See Steel.)*

Cupola

CONTROL. *"Progress in Cupola Control," Canada's Foundry Journal,* vol. 16, No. 4, April, 1943, pp. 5-6, 8, 10. Excerpts from an address by E. Wharton, a British authority on cupola control, trace the developments in cupola design which resulted from direct problems in cupola melting. Developments discussed include the center-blast cupola, automatic blast-gate control, constant-pressure blowers, single row tuyeres, multiple row tuyeres, and the balanced-blast cupola. The balanced-blast cupola admits sufficient air through a lower row of tuyeres to burn the carbon to carbon monoxide. Auxiliary tuyeres at higher levels can be adjusted to admit the proper amount of air to burn the carbon monoxide to carbon dioxide. One great advantage of this arrangement is the reducing effect of the carbon monoxide zone through which the molten metal must pass.

DESIGN AND OPERATION. *(See Furnaces.)*

Furnaces

CUPOLA DESIGN AND OPERATION. *"Cupola Fuel Economy," Canadian Metals and Metallurgical Industries,* vol. 6, No. 5, May, 1943, pp. 35-36, 38, 44. Thermal efficiency of a cupola is greatly influenced by design and operation of the cupola. The height between the tuyeres and the charging door should be sufficient to allow the charge to absorb enough heat from the exhaust gases so that they escape at a low temperature. When building restrictions prevent raising a charged door which is too low, the efficiency may be somewhat improved by flaring the lining above the melting zone. This, however, is not desirable unless one mixture is melted continuously. The total tuyere area should be from one-fourth to one-seventh the cross-sectional area of the inside at tuyere level. Unless multiple tuyeres are used to provide complete combustion of carbon, the double row necessitates the use of more coke in the bed, thus increasing fuel consumption. Proper bed height should be determined and carefully built-up each time the cupola is started. After the bed has been charged, the charges should be built up to charging door level and maintained there throughout entire heat. It is preferable to weigh charges, rather than measuring them by shovels or forksful. If charges are weighed, the ratio of metal melted to coke charged can be determined. This ratio will vary with the analysis of the metal charged, as well as the condition of the charges. Allowing the slag hole to remain open after the first slag has been drawn off reduces the thermal efficiency. At the end of the heat the blast should be left on until all metal is melted, and then it should be turned off in order to conserve any coke which has not burned. The bottom should be dropped, and the debris should be thoroughly quenched to save as much as possible of the fuel charge for re-use. After each melt the lining should be repaired, returning the inside to the original dimensions. Melts should be of as great length as possible, for the same bed charge must be used for either short or long melts. Quality of coke used is important and should be maintained if the greatest possible fuel economy is to be obtained.

ELECTRIC FURNACES. *"Electric Flashbacks in Furnace History,"* George F. Mullan and W. E. Moore, *Canada's Foundry Journal,* vol. 16, No. 5, May, 1943, pp. 5-6, 8, 10. The authors describe and illustrate the history of electric furnaces, tracing the improvements which have resulted in our present day type of furnaces.

Gamma-Ray

INSPECTION. *(See Inspection.)*

Gating and Risering

TECHNIQUE. *"The Gating of Castings,"* E. W. Harding, *Foundry Trade Journal,* vol. 69, No. 1393, April 29, 1943, pp. 343-348. Among the many casting defects traceable to incorrect gating are sand and slag inclusions, misruns and cold shuts, shrinkage, mold and core scab, and distortion. These may generally be eliminated by correctly designed gating which efficiently traps sand and slag, produces the correct heat distribution within the casting, produces a minimum amount of mold surface erosion, and allows the metal to enter the mold at a suitable rate. Gating systems employed for sand trapping include cope runner bar with drag ingates, cope projection gates, flow-by gates, syphon skim gates, whirl gates, and strainer cores. Correct heat distribution may be obtained by either gating into lighter sections and thus equalizing the temperatures throughout the casting, or by gating into and feeding the heavier sections. Mold surface erosion may be eliminated by avoiding sharp corners and angles in gat-

ing systems, locating gates so that metal does not strike directly against cores or sharp mold corners, avoiding running metal onto surfaces from which it will drop to a lower mold level, and avoiding nozzle effects which result from construction of the ingates at the casting. Pouring speeds are controlled by the total ingate area and the head of metal from basin to ingate. Correct pouring speed is determined partly by casting size and partly by other mold features such as cores, flat top surfaces, etc. Pouring basins should allow the sand and slag to float to the surface of the molten metal before it enters the mold, and should allow metal to enter the mold quietly at a constant velocity. The author describes a film which shows the behavior of metals in various gating systems. Following the article is a discussion of gating problems for specific castings.

Hardenability Testing

STEEL. (*See Steel.*)

Inspection

GAMMA-RAY. *"A Rapid Gamma-Ray Inspection Technique,"* Robert C. Woods, *Metals and Alloys,* vol. 17, No. 4, April 1943, pp. 764-766. In the past, the long exposures required in gamma-ray inspection have counteracted the principal advantage of economy, as compared with x-ray inspection. Since the gamma-ray source cannot be altered, any reductions in exposure time must result from improvements in the photographic setup. The short wave length of gamma rays results in a large proportion of scattered radiation which has necessitated the use of lead screens. The use of fluorescent screens intensified the effects not only of the primary radiation but also of the undesirable scattered radiation. However, by using both lead and fluorescent screens advantage may be taken of the intensifying effects of fluorescent screens, while the lead screens keep scattered radiation below an objectionable amount. Film used in conjunction with both lead and fluorescent screens should be of the type sensitive to fluorescence. Two fluorescent screens are not desirable, because fluorescing of their large grains obliterates some of the detail recorded on the finer grained film.

RADIOGRAPHY. *(See Radiography.)*

X-RAY TECHNIQUE. *(See Radiography.)*

Magnesium

ALLOYS. *"The Metallography of Magnesium Alloys,"* J. B. Hesse and P. F. George, *The Metal Industry* (London), vol. 62, No. 9, Feb. 26, 1943, pp. 136-138. Presents the metallography of cast, extruded, forged and rolled magnesium alloys, illustrating microstructures with photomicrographs. They also describe the effects of solution and precipitation heat treatments. Appended to the article is a description of the methods of grinding and polishing magnesium alloys.

DESIGN OF MAGNESIUM PARTS. *"Designing Magnesium Parts for Strength and Wear," Product Engineering,* vol. 14, No. 6, June 1943, pp. 374-375. Two pages of drawings illustrate design and shop practices for magnesium parts which are recommended to counteract their susceptibility to stress concentrations and abrasion when subjected to friction, particularly without adequate lubrication.

Malleable Foundry

CONVERSION TO STEEL. *"Converting to Steel Castings,"* James H. Smith, *The Iron Age,* vol. 151, No. 16, April 22, 1943, pp. 45-50. The author describes the conversion of a malleable iron foundry to a steel foundry. Much of the equipment and many of the methods used in malleable work were adapted to steel castings production with few or no changes. Steel castings are now produced on a continuous basis. Most of the jobs are small steel castings produced in very large quantities.

Malleable Iron

SUBSTITUTE ALLOYS. *"Substituting Malleable and High Strength Iron," Canadian Metals and Metallurgical Industries,* vol. 6, No. 5, May, 1943, pp. 27-28. This article describes successful substitutions of malleable and high strength cast iron alloys for bronze and steel alloys in ordnance parts.

Melting

CUPOLA DESIGN AND OPERATION. *(See Furnaces.)*

Non-Ferrous

PRODUCT CONTROL. *"Control of Non-Ferrous Metals,"* A. C. Boak, *Canadian Metals and Metallurgical Industries,* vol. 6, No. 4, April, 1943, pp. 20-24. Allotments of tin, copper, nickel, zinc, aluminum, and lead for use in Canadian non-ferrous foundries are closely controlled by the Office of the Metals Controller. Most of the available alloy scrap is turned over to producers of non-ferrous ingot metal, who are better able than the individual foundry to reclaim the alloy content. As the result of this practice, non-ferrous foundries need not carry large stocks of alloying metals. Determination of physical properties of test bars is most important in the use of alternate specifications or materials. In order to obtain accurate and consistent results, the following procedures should be followed in making test bars: (1) Pyrometric control should be exercised; (2) metal should be poured at a temperature which is correct for the alloy used and the type of bar being poured; (3) melting conditions should be closely controlled; (4) metal should be well alloyed and stirred before pouring; (5) metal should be completely deoxidized; (6) molding conditions should be standardized, preferably by the use of dry sand molds.

MAGNESIUM ALLOYS. *(See Magnesium.)*

SUBSTITUTION FOR IRON. *(See Malleable Iron.)*

Radiography

DETERMINATION OF DEPTH OF DEFECTS. *"Measuring the Depth of a Defect,"* Michael Joseph, *Industrial Radiography,* vol. 1, No. 4, April, 1943, pp. 29-30. A simple means of determining the depth of defects in a metal object consists of making two x-ray exposures on one film, using a different tube angle for each exposure. The double exposure will leave two marks of one defect. The distance between the two marks, and the lines of x-ray penetration from the defect to the film-mark for each tube-angle shot form a triangle, of which one side and three angles are known. Computing the length of the vertical from the defect to the film and subtracting from this value the film-to-object distance will give the height of the defect producing the film marking above the bottom of the object.

NON-DESTRUCTIVE TESTING. *"Radiography as an Aid to Foundry Technique,"* W. Gladwell, *The Metal Industry* (London), vol. 62, No. 9, Feb. 26, 1943, pp. 132-134. Gives a simple explanation of how flaws in metal parts may be detected without destroying the parts. He compares x-ray and gamma-ray inspection and describes the characteristics of radium which make its use desirable for inspection of dense metal parts. With the aid of illustrations, he describes several typical high conductivity copper alloy castings, telling how they were molded, and how gamma-ray inspection revealed flaws which were eliminated by changes in methods of running, risering, or other practices. The use of radiography, as cited in the article, enables the foundryman to produce sound castings.

X-RAY TECHNIQUE. *"A Method for Compiling an Accurate X-ray Technique Chart,"* J. J. Allen, Jr., *Industrial Radiography,* vol. 1, No. 4, April, 1943, pp. 51-53. A graph with kilovoltage plotted against part-thickness, all other factors being held constant, is an accurate chart for determining exposures for any thickness of a given alloy. Such a chart may be made by selecting and standardizing darkroom procedure, target-to-film distance, tube angle, film holders and screens, and a milliampere-second factor which does not call for impractically long exposures. Various thicknesses of a given alloy, in the form of a step bar with a penetrameter placed on each thickness, may be radiographed, using different kilovoltages. The best kilovoltage and kilovoltages which permit detection of a 2 per cent thickness variation may be determined by viewing the film with standard illumination. Kilovoltages may then be plotted against metal thicknesses.

Refractories

CHROMITE AND MAGNESITE. *"Chromite and Magnesite Refractories,"* Dr. Gilbert E. Seil, *The Refractories Journal,* No. 2, Feb., 1943, pp. 39-41. Chromite refractories withstand service conditions associate with steel production better than any other type of refractory. Chromite is composed of varing proportions of MgO, FeO, Cr_2O_3, and Al_2O_3. The higher the FeO content, the more chemically active the chromite will be. The relative amounts of Cr_2O_3, and Al_2O_3 have little effect on the refractoriness. The presence of magnesium silicate which melts at low temperatures is very undesirable. An excess of magnesium silicate can be corrected by adding enough magnesia to convert it to magnesium orthosilicate. Chromite refractories have been used in England in nearly all furnace positions except in open-hearth roofs. Magnesite is the basic refractory second in importance in England. England's newest source of magnesite is sea water. The process, by which magnesite is recovered more economically than it can be mined, starts with solar evaporation of sea water and isolation of magnesium salts which are then converted to magnesium oxide.

Safety Equipment

SHOE STANDARDS. *"War Standards for Industrial Safety Shoes,"* Morris L. Chandrass and Arthur J. Truelson, *Industrial Standardization and Commercial Standards Monthly,* vol. 14, No. 2, February, 1943, pp. 49-52. The authors discuss the requirements and proposed specifications for safety shoes for men and women in industry.

Sand

SAND CONTROL. *"The Importance of Sand Control,"* F. A. Allen, *The Metal Industry* (London), vol. 62, No. 19, May 7, 1943, pp. 293-294. Control of sand is a factor in producing sound castings and maintaining scrap losses at a minimum. Often neglect of sand control will cause molding machines to operate inefficiently, and molding equipment will be unjustly blamed for unsatisfactory results. Synthetic sands are more easily controlled than natural sands, because of the greater uniformity. However, control of natural sands is possible and desirable. Synthetic sands generally dry out quickly, and the base sand is more expensive than natural sands. Moisture, grain size distribution, clay content, and mold hardness tests, performed at least once a week, should do much toward maintaining a product of uniformly high quality.

Shoes

SAFETY STANDARDS. *(See Safety.)*

Steel

CARBON REPLACING ALLOY. *"Plain Carbon Replaces Alloy Steels,"* A. S. Jameson, *The Iron Age,* vol. 151, No. 19, May 13, 1943, pp. 59-65. The author reports the results of tests performed to determine the hardenability and physical properties of medium carbon steels, with view to replacing alloy stels with medium carbon steels. Steels observed had carbon contents ranging from 0.32 to 0.50 per cent. The maximum section size in which maximum hardness could be obtained throughout the specimen was determined. With the aid of curves and tables, the author shows the effects of carbon content, quenching medium, grain size, chromium content, and manganese content. He also shows the relation between tensile properties and hardness in several of the medium carbon steels.

CORROSION RESISTANCE. *"Corrosion of Unstressed Specimens of Alloy Steel by Steam at Temperatures up to 1800°F."* G. A. Hawkins, H. L. Solberg, J. T. Agnew, and A. A. Potter, *Transactions of the A.S.M.E.,* vol. 65, No. 4, May, 1943, pp. 301-308. Sand blasted specimens of various steels containing up to 18 per cent chromium and 25-20 and 25-15-2-W steels were subjected to a flow of superheated steam for 500 hrs. at high temperatures. When the testing time was completed, any scale was removed by mechanical and electrolytic means, and the specimens were weighed to determine the corrosion loss. All of the steels except the 25-20 and 25-15-2-W specimens started to corrode at less than 1800°F., this temperature increasing with the chromium content. An exception to this was a 12 per cent Cr steel with a high sulphur content which was almost entirely consumed at 1800°F. Apparently the high sulphur content was responsible for the high temperature reaction. The 25-20 and 25-15-2-W steels were subjected to superheated steam at 1800°F. for 1300 hrs. and showed very good corrosion resistance. The authors use tables and graphs to present and interpret the test data.

CREEP STRENGTH. *"Effect of Deoxidation Practice on Creep Strength of Carbon-Molybdenum Steel at 850 and 1000°F,"* R. F. Miller, *Transactions of the A.S.M.E.,* vol. 65, No. 4, May, 1943, pp. 309-316. Two steels having the same nominal composition were deoxidized with 0.5 lb. and 1.5 lb. of aluminum, respectively. The steel deoxidized with 0.5 lb. aluminum had a low austenite grain-coarsening temperature, while that deoxidized with 1.5 lb. aluminum had a high austenite grain-coarsening temperature. By appropriate heat treatment, both steels were given three microstructures: (1) coarse ferrite-pearlite, (2) ferrite Widmanstatten, and (3) fine ferrite-pearlite. Tests comparing similar microstructures of the two steels showed that the low-aluminum steel had a higher hardness and a lower impact value than the high-aluminum steels. At 1000°F. the low-aluminum steels were more creep resistant at stresses under 12,000 psi and showed a larger decrease in creep rate with time than did the high-aluminum steels. Comparing all three microstructures for each type of steel at 1000°F. showed that the coarse ferrite-pearlite structures were more creep resistant and more consistently showed a decreasing creep rate than did the ferrite Widmanstatten structures. In the same manner the ferrite Widmanstatten structures proved better than fine ferrite-pearlite structures. In both steels the ferrite-pearlite structures had lower hardness and impact strength than the ferrite Widmanstatten structures. Coarse ferrite-pearlite structures had higher creep resistance than the fine ferrite-pearlite structures at 1000°F., but lower creep strength at 850°F. At 1000°F. the coarse ferrite-pearlites had the highest creep strength but their initial impact strength was low and became even lower as the test progressed. The fine ferrite-pearlite had the highest initial impact strength but the lowest creep strength. The ferrite Windmanstatten structure had good creep strength and the lowest deformation of the three microstructures. Its initial impact strength was high and deteriorated little as the tests advanced. These tests indicate that even when the two steels of the same composition are treated to secure the same type of microstructure and grain size, the low-aluminum steel will have better creep resistant properties than the high-aluminum steel.

HARDENABILITY. *"How to Use the Jominy End-Quench Test,"* Greswold Van Dyke, *Steel,* vol. 112, No. 20, May 17, 1943. Heat treating characteristics of steels may be determined quickly, inexpensively, and reasonably accurately by means of the Jominy end-quench test. In the test a specially machined test specimen is heated to the quench temperature, and quenched. Then the decarburized surface is removed, and hardness determinations are made along the length of the specimen. Hardness readings are highest at the end which cools more quickly, and decrease as the distance from the end increases. Since hardness is a function of the cooling rate, heat treatment characteristics for sections of any size can be predicted on the basis of Jominy end-quench test results provided the cooling rate of the particular section is known.

HARDENED STEELS. *"Properties of Hardened Steels,"* John E. Erb, *The Iron Age,* vol. 151, No. 21, May 27, 1943, pp. 39-47. Hardened steels, which are used with a surface hardness of 500 Brinell or more, are of three classifications: (1) case-hardened (mild), (2) tough-hard (medium), and (3) hard (hard). Hardened parts are potentially brittle, are more sensitive to stress raisers than are softer alloys, and consume more time in production. Increased carbon content gives greater hardness, wear resistance, tensile strength, and compressive strength. The results of tests from which these conclusions are drawn are presented by the author in the form of curves. Other alloying elements increase hardenability, but do not increase hardness. The author also describes the results of bend and Charpy impact tests, made with notched and unnotched specimens of case-hardened, tough-hard, and hard steels. Cleanliness and freedom from defects is extremely important in parts which are to be hardened. Likewise, surface defects have an exaggerated effect on parts which will be hardened. This is less true of case-hardened steels where the soft core gives greater resistance to notch effects. Tough-hard steel develops maximum tensile and elastic properties. Hard steel is recommended only for parts subjected to high compressive loads, such as ball bearings.

REFRACTORIES. *(See Refractories.)*

SUBSTITUTE ALLOYS. *(See Malleable Iron.)*

Supervision

MANNING TABLE. *(See Training.)*

Testing

HARDENABILITY. *(See Steel.)*

NON-DESTRUCTIVE. *(See Radiography.)*

Training

MANNING TABLE. *"The Supervisor's Job in Manning Table Preparation,"* Russell J. Green and E. B. Mapel, *Supervision,* vol. 5, No. 5, May, 1943, pp. 4-5. The Manning Table and Replacement Schedule, which have been prepared by the War Manpower Commission, analyzes skills of present workers, and schedules their withdrawal for military service and replacement by available men and women. Rightly, the Manning Table should be filled out by the foreman. The Table should be carefully set up if it is to be of greatest value. The foreman should thoroughly understand exactly how the Manning Table and Replacement List will be used, and he should be familiar with the War Manpower Questionnaire and its interpretation by Selective Service authorities.

July Chapter Meeting Schedule

July 10
Toledo
"The Towers," Irish Hills, Mich.
1st Annual Outing

July 16
Wisconsin
New Ozaukee Country Club
8th Annual Golf Furlough

August 21
Chicago
Lincolnshire Golf Club
Annual Stag Outing and Golf

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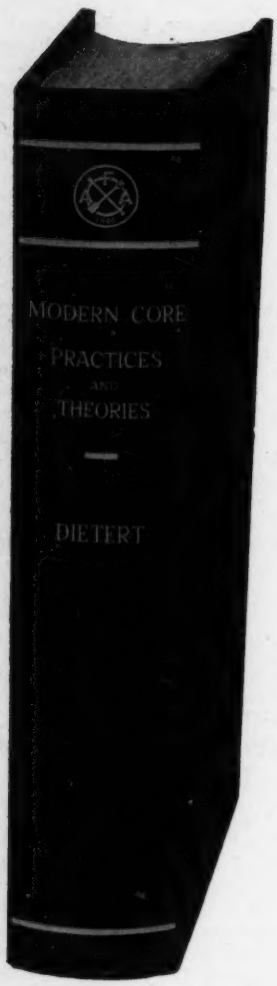

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